COMPUTERWORLD

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NEWSPAPER

Mixed Reviews On Memorex Sale

By Marcia Blumenthal
CW Staff

DETROIT — Burroughs Corp.'s decision last week to purchase Memorex Corp. for about $105 million in cash is an acquisition that sparked little enthusiasm and raised a lot of eyebrows among industry observers.

Under the terms of the proposed merger, which has the approval of the boards of directors of both companies, Memorex will operate as a wholly owned subsidiary of Burroughs. Because the two firms will retain their own sales and service units, it is highly unlikely that end users of Memorex products will be impacted by the acquisition.

Analysts had mixed opinions about the acquisition. Burroughs Chairman W. Michael Blumenthal already has his work cut out getting Burroughs back on the right track and the firm does not have the expertise in the OEM or IBM plug-compatible peripherals market, observed Thomas Crotty, vice-president of the Gartner Group.

On the plus side, Crotty said the acquisition would provide Burroughs additional modern manufacturing sites at a good price.

Moreover, Jay P. Stevens, an analyst with Oppenheimer & Co., also questioned whether Burroughs could cope with Memorex's financial problems at the same time it was putting its own house in order.

Burroughs' bookings were down for the first six months compared to the same period last year, Stevens noted. He was skeptical about the firm's ability to support a mainframe product line that is nearly as broad as IBM's at the same time it was expanding into small business and office

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VSS Combines Hardware, Software

STC Offers Missing Link for MVS

By Lois Paul
CW Staff

LOUISVILLE, Colo. — Storage Technology Corp. (STC) has provided what it claims is "the missing element in IBM's MVS architecture" by introducing the Virtual Storage System (VSS). VSS represents STC's first step into the manufacture of total systems, rather than just plug-compatible hardware.

Under development for nearly three years, VSS was described as an intelligent system that attaches to IBM and plug-compatible mainframes running under MVS. It combines hardware, software and system integration techniques for the storage and management of sequential data.

VSS will be available next July, according to STC. A limited number of systems will be installed in the first quarter of 1982.

VSS was designed to provide high-speed I/O capability for the large-CPU environment without the necessity for host buffering, an STC spokesman explained. It reportedly off-loads I/O functions from the CPU to minimize internal memory requirements and free processor time and space for more effective utilization.

The VSS system is located between the main CPU and the I/O devices. The main CPU communicates with the VSS Virtual Control Processor (VCP), an "outboard" hardware component that maps requests for data (reading or writing) into appropriate storage locations, Richard Kiefer of the STC Systems Product Marketing Group explained.

The "inboard" component of the VSS system is the VSS Execution Subsystem (VES), which runs under MVS and communicates with the outboard parts of the system.

The VCP is an IBM-compatible Magnuson Computer Systems, Inc. M80/40 mainframe, which STC pur-

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Challenge, Recognition Lift DP Morale, Survey Finds

By Brad Schultz
CW New York Bureau

On the job, what do DPers want?

Junior members of a DP staff want challenging work with new systems that seem important. Senior members want assurance of career growth ahead, recognition for jobs well done and smooth relations with user departments.

A DP staff's morale largely hinges on those factors, according to a dozen DP managers *Computerworld* polled across the nation last week. The telephone survey respondents manage staffs that range in size from eight to 70 members — counting computer operators and data entry crews — and support a wide range of applications in each case.

How do you know when a DP staff's morale is slumping? Most respondents agreed with management information systems (MIS) manager Dale Katzenmeyer of Denver-based Wright & McGill Co., who said quality of work drops and absenteeism rises when moods sour around the terminals.

An unhappy staff starts "dropping the ball," observed Robert Dyer, senior vice-president for DP at Fox-Vliet Drug Co. in Wichita, Kan. Such a staff fails to meet target dates, added Thomas Pawlick, who directs DP at Star Supermarkets, Inc. in Rochester, N.Y.

Junior DPers, such as entry-level programmers, are ripe for a low morale period when they lose sight of what their work means to the organi-

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Graphics Products, Technology Give Big Picture at Siggraph/81

By Tim Scannell
CW Staff

DALLAS — Despite searing Southwest temperatures and a travel-crippling strike of the nation's air traffic controllers, thousands of people poured into this city last week to get a glimpse of the latest in computer graphics technology.

The occasion was the Association for Computing Machinery's (ACM) eighth annual conference on computer graphics and interactive techniques, more familiarly known as Siggraph/81. Held at the sprawling Dallas convention center, the exhibition portion of the show boasted more than 130 vendors; the conference portion included 18 one- and

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Can U.S. Fly Safely Without Patco?

If Your Paper Arrived Late . . .

. . . It probably means the air traffic controllers are still on strike.

Normally, 75% of the *Computerworld* newspapers printed every week are put on planes that drop them at air mail facilities in nine different geographic areas. The issues are then distributed locally.

Computerworld developed an alternative distribution system in case the air traffic controllers' strike continued through last weekend. However, some delays in delivery can be expected, and we ask for our readers' patience.

Wide World Photo

By Marguerite Zientara
CW Staff

WASHINGTON, D.C. — In the wake of the air traffic controllers' walkout last week, one of the key questions was whether the government can safely separate aircraft without the 13,000 striking members of the Professional Air Traffic Controllers Organization (Patco).

"We are not moving any more traffic than we can safely move," Federal Aviation Administration (FAA) spokesman Fred Farrar said last Wednesday, adding that the agency was managing to direct 60% to 65% of scheduled air traffic with 30% of the controller force of 17,500 and about 2,400 supervisors.

However, Patco members had a dif-

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Commerce: Watch Your Language

By Bruce Hoard
CW Staff

WASHINGTON, D.C — The U.S. Department of Commerce is using word processors to mount an escalade against pleonastic persiflage.

Really.

In an effort to clean up galloping gobbledygook, Commerce Secretary Malcolm Baldridge commissioned a quasi-computer program that sees red at the sight of such cherished bureaucratise as "hereinafter," "effectuated" and the always popular "I would like to express my appreciation . . ."

Wang Laboratories, Inc. word processors are reacting with "Don't use this word!" when such other goodies as "bottom line," "it is my intention," and "untimely death" are entered into the system.

The system in this case consists of roughly 70 terminals used by some 250 employees in Commerce's Economic Development Administration (EDA), International Trade Administration (ITA) and the Special Counsel's office.

Baldridge, a former cowboy, is crusading for active verbs, lean sentences and succinct adjectives, according to Steve Piekarec, an ITA management analyst. "He wants writing halfway between Zane Grey and Ernest Hemingway," Piekarec commented.

The quasi-program key to cleaner writing is a "glossary" that runs independently of a CPU and only on the Wang machines. At the behest of Baldridge, temporary ITA employee Al Eisen put it together.

Lest this conjure up images of Baldridge as a big brother type, it should be noted the system is voluntary. "It's not programmed into the system software," Piekarec observed. "You have to start it yourself."

The management analyst said he did not know just how many employees were using the antigobbledygook glossary, but Piekarec did say "A lot of people think it's a lot of fun."

Evidently, the Commerce secretary fails to see any humor in the situation. According to Piekarec, at one time after the program started in March, Baldridge had agents stationed at all agencies within the department to make sure there were no tautologous leaks.

Upon assuming his post at Commerce, the new secretary noted, "many people spoke in multisyllabic words and phrases that I'm not sure even they understood completely.

"The only reason I could see for them talking that kind of talk was a subconscious urge to cover one's self. There is a kind of protection in statements and a recommendation so vague that it can be interpreted two or three ways on a single issue.

"That's not communicating, that's covering one's flanks."

DPer Draws Three Years For Bribery, Kickbacks

By Jeffry Beeler
CW West Coast Bureau

REDWOOD CITY, Calif. — A former DP manager living in Silicon Valley recently received a three-year prison sentence for taking bribes and kickbacks while heading the computing departments for two Northern California counties.

The sentencing by a San Mateo County Superior Court judge here came after George Vandermate, 48, pleaded guilty to charges that he accepted $53,000 in illegal payments while serving as the county's DP manager.

Vandermate also pleaded no contest to similar charges filed against him by neighboring Santa Clara County, where he worked as DP manager between 1977 and 1978. Vandermate's admission of guilt to the Santa Clara County bribery charges resulted in an additional prison sentence, which he will be allowed to serve simultaneously with the San Mateo County jail term.

During his stint as Santa Clara County's DP manager, Vandermate apparently solicited and received $19,600 in kickbacks from a business associate named Rene Bazan, who recently pleaded no contest to one count of offering bribes.

Bazan, who at the same time was managing a Sunnyvale, Calif.-based keypunch data entry firm known as Theard and Associates, agreed to pay the bribes in exchange for Vandermate's help in awarding the company lucrative county contracts [CW, May 12, July 14, 1980].

Bazan's illegal payments went to a nearby dummy corporation named Casey and Associates, which Santa Clara County law enforcement authorities have since linked to Vandermate.

In Sept. 1978, Vandermate resigned as the county's DP manager to take a similar position in San Mateo County, where his kickbacks-for-contracts scheme apparently continued at an accelerated pace.

Between late 1978 and March 1980, when he was fired from his San Mateo County job amid a cloud of suspicion and allegations, Vandermate is believed to have awarded area companies as much as $475,000 worth of data entry contracts in return for more than $50,000 in bribes. Vandermate's illicit activities in Santa Clara County, which surrounds Silicon Valley, prompted police to file four criminal charges, two of which were later dropped in exchange for the former DP manager's guilty plea.

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STC Offers Missing Link

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chases and maintains. Each VCP contains two to eight channel adapters, which each consist of two Zilog, Inc. Z8000 microprocessors, with a Signetics Corp. 8/300 functioning as the channel interface manager.

The VCP also includes hardware designed to accomplish data transfer and data compression.

Its Virtual Operating System (VOS) software primarily handles I/O activities of tapes and disks. Additional "functional" software is where the "intelligence" of VSS for managing stored data is contained, according to Kiefer.

VCP resident programs for the control of storage management, backup/recovery functions and system utilities required 130,000 lines of Pascal code. Another 15,000 lines of ACL code govern system utilities and compose an operating system that is a modification of DOS, the vendor explained.

Resident in the host operating system (MVS) are another 45,000 lines of Pascal and 54,000 lines of Assembly language code, which enable the user to specify VSS as the storage subsystem and to access data according to standard I/O access methods.

VSS can provide the user with true independence of the devices on which data is stored because of the "intelligence" of the software in the system, Kiefer maintained.

It essentially frees the application or systems programmer or the space manager from the data management concern, he said, by dynamically allocating space on the back-end direct-access storage device as the data set is written.

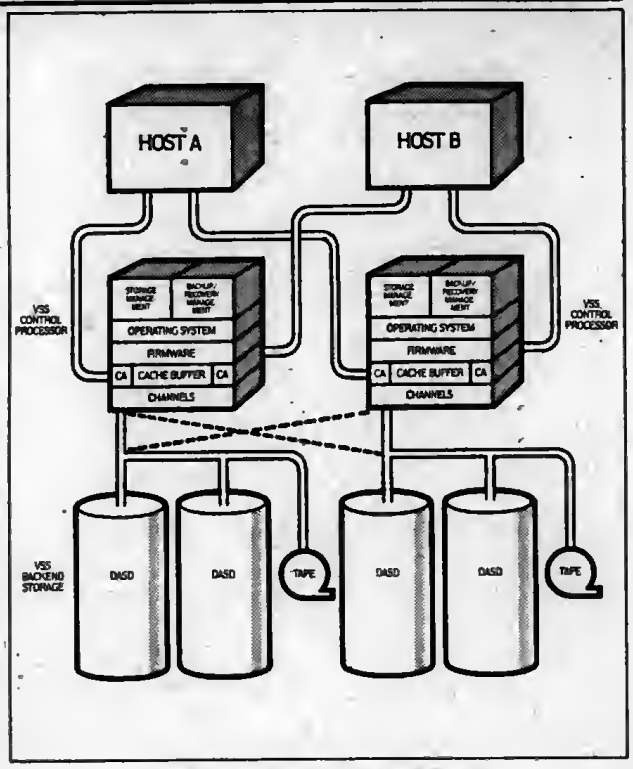
In terms of bytes of data stored on a disk track, STC expects to achieve 100% utilization, Kiefer said. VSS also includes a data compression algorithm that is said to reduce the size of stored data by 25%.

The system reportedly offers a dynamic recovery capability that is controlled by operating software and is transparent to the user.

Backup methods include a cyclic backup, which copies changed data to tape at regular intervals; "tape journaling," which automatically writes data sets to magnetic tape concurrently with disk; and "shadow recording."

A typical configuration of VSS would include two VCPs (for redundancy) with 4M bytes each of cache-storing software; six STC 3650 tape drives; and 16 STC 8650 disks with a total raw storage capacity of 20.3M bytes of on-line storage on disk.

This would run over $53,000/mo on a three-year lease, the STC spokesman said.



VSS Hardware/Software Configuration

STC: Virtual Storage System More Than Sum of Its Parts

LOUISVILLE, Colo. — The components of the Virtual Storage System (VSS) are contained in a variety of other systems and programs currently on the marketplace. What Storage Technology Corp. (STC) did was choose the effective techniques and combine them in a comprehensive package for storing and managing sequential data, Richard Kiefer of STC's Systems Product Marketing Group explained.

VSS also reportedly will permit the user to incorporate new technologies as they become available without the usual problems of conversion.

For the data manager, Kiefer said, VSS will mean better utilization of space, disk space in particular, and a possible reduction in the amount of floor space in the computer room to store the same number of bytes of data.

This will be further augmented by the ability to migrate inactive data from disk to tape on an intelligent basis, he said, giving the data manager more flexibility in the growth of the system.

It will remove a lot of the labor-intensive functions such as space management and recovery outboard, surrounding them with intelligent software and automating them.

VSS is important to STC because it represents a major step into the system market where there are major software components in a product.

"This postores us in the marketplace to demonstrate that STC can deliver and support a software-oriented system," he said. "It also demonstrates that we can provide functional compatibility to users and we are not tied to a plug-compatible type of system."

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Mixed Reviews on Memorex Sale

(Continued from Page 1)

automation systems and now the peripherals business.

Notwithstanding the skepticism of Wall Street analysts, Blumenthal said the acquisition reflected the great emphasis his firm planned to give to computer memory devices in the future. Both firms have announced plans to improve their positions in the OEM peripherals market, but neither company at the present time has made strong inroads into this market. Moreover, Blumenthal said the acquisition would provide the firms economies in research and development, manufacturing and purchasing related to peripheral devices.

"We are not looking for a quick contribution from Memorex on our financial results, but we expect that to happen in the coming years," observed William Conlin, Burroughs senior vice-president of corporate products management.

Conlin said the price the firm planned to pay for Memorex was not out of line with the book value of the firm.

For the time being, Burroughs plans to continue to operate Memorex as a wholly owned and independently run subsidiary. "We do not intend at this time to change Memorex's business plan," Conlin said.

While Burroughs' strategy in the peripherals market could be compared to that of Control Data Corp., whose OEM and IBM-compatible peripherals business is a highly profitable adjunct to its high-end computer mainframe line, some observers wondered whether the firm was looking at the acquisition as a means of vertically integrating its manufacturing operation or competing in the IBM world.

Conlin said the firm had no intention of changing the characteristics of Burroughs to go after IBM's share of the market more than it has in the past or to compromise its system architecture to make it more IBM-compatible. Nonetheless, Conlin said "we'd want to develop products that coexist in an IBM network."

Developing an interface to make Memorex disks compatible with Burroughs systems would be a relatively easy task, but software support would not be so easy, one technical specialist noted.

Within the past week, Memorex stock has climbed from $11.25 to $12.87 per share while Burroughs stock dropped from $37.38 per share to $35.25 per share.

The Burroughs offer of $14.50 for each outstanding share of Memorex common stock outbid the week-earlier offer made by Storage Technology Corp.

CW Staff Writer Bill Laberis also contributed to this article.

Three Years After Introduction

Cincom's TIS, LUV Software Ready for Market

By Marcia Blumenthal
CW Staff

CINCINNATI — The Total Information System (TIS) introduced three years ago by Cincom Systems, Inc. is now ready for commercial distribution. Its release follows the completion of successful testing with 13 users and the release of Logical User View (LUV) software, the integrating component of the system, the vendor said.

While the data base management system (DBMS) has generally been the pivotal component in most information handling systems, TIS was designed to integrate system components such as Cincom's teleprocessing monitor (Environ/1), directory (TIS Directory) and its Total DBMS with standard problem-solving (Mantis) and query (TIS/Query) applications. Eventually, TIS will link in a network control program and access text, the firm said.

LUV provides a relational view of all data, giving programs complete independence from the operating system and structural independence of all data, the firm said.

"TIS represents a new approach to implementing applications. With the LUV concept in TIS, users can isolate themselves from the burdens of change — whether they be hardware- or environment-related," said Thomas M. Nies, Cincom president.

Because current DBMS technology does not provide data structure independence, those changes would require troublesome conversions to access data, they charged, noting the conversions that were necessary to take advantage of disk storage technology.

Essentially, the LUV ties all components of the system together, making it immaterial from where in the system the data is gathered. Although the concept of LUV was introduced with the original product, it was not available for programmers to use, explained Ron Weeks, TIS product manager.

Smaller Programs

With this new level of independence, programs written for the TIS environment can be smaller, less complex and require less maintenence over the long term, the firm noted. Only four commands are required to carry out any data operation — GET, WRITE, INSERT and DELETE.

Although the majority of the code of the TIS DBMS is different from Cincom's Series 80 Total DBMS, all existing file structures of Total and programs written against that system are upwardly compatible with TIS, Weeks noted.

Moreover, TIS is not dependent on using its own DBMS. Cincom expects to integrate IBM's IMS and DL/1 systems with TIS eventually, according to Alex Kuli, corporate marketing manager.

System integration is reportedly achieved through the use of the TIS Directory, which stores all information necessary for the LUV processor to access physical data and ensures that all the components of TIS work together.

Although TIS does not have to be used with LUV, the firm is gearing the TIS product as an upgrade for Total users.

The TIS DBMS and directory is priced in the $100,000 range and the LUV component is priced at about $30,000, the firm said. The entire TIS system carries a price tag in the $200,000 to $250,000 range.

Cincom is located at 2300 Montana Ave., Cincinnati, Ohio 45211.

Micru Gets Nod From Microdata

NEW YORK — Microdata Corp. announced that it has recognized Micru International as its official users group. The announcement came at Micru's summer conference held here last week.

Micru President Susan Greenwald said that over the last year Microdata has been very responsive to the group, unlike its feelings in the past when Micru was almost thought of as a hindrance.

"We are not here to beat them [Microdata] over the head or to be negative or critical, we just want to influence Microdata constructively and communicate users' ideas," said William A. Anderson, one of Micru's founders and a member of its executive committee.

One way in which information flows formally between Micru and Microdata is through a recommendations program, officials said.

The coordinator of the program, Steve VanArsdale, explained that Micru collects enhancement requests from users and then passes them on to Microdata. At the last conference, 140 requests were collected, 38 of which are expected to be implemented by Microdata in late 1981 or early 1982.

The next Micru conference is scheduled for Feb. 7-11, 1982 in San Diego, Calif.

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Backup Necessary?

U.S. Postal Service Ecom May Be in Jeopardy

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Mass mailers that are relying on the U.S. Postal Service (USPS) to offer its much-publicized Electronic Computer Originated Mail (Ecom) service next January would do well to have a backup system ready just in case. Ecom may not make it.

The whole question of whether the government should be in the electronic message business when commercial firms are offering similar services appeared to be answered late in 1979. That was when the U.S. Postal Rate Commission (PRC) authorized Ecom as an experimental service.

But the postal service's governors did not want to offer Ecom on an experimental basis. So they took the PRC to court. Last May, the court agreed with them that the PRC had exceeded its authority.

However, much against the governors' wishes, the court then remanded the whole Ecom case back to the PRC for reconsideration. In the process, the earlier authorization was erased and opponents were presented with another opportunity to argue that Ecom really is not necessary.

Analysis

A multitude of suggestions for restructuring the service were submitted to PRC late last month.

The most drastic advice came from the Reagan administration, in the form of a joint filing written by the Department of Justice and the National Telecommunications and Information Administration (NTIA). They said Ecom is unnecessary because commercial suppliers are already offering similar services and there is a "significant chance" Ecom will be subsidized by the taxpayers, discomfiting them as well as Ecom's prospective competitors.

Even if the PRC authorizes a permanent Ecom service before next January, start-up may still be delayed because of opposition from the competitors.

Postmaster General William Bolger has said repeatedly that USPS wants to cooperate with, not compete with, commercial electronic mail service vendors, but the vendors are not convinced. Their suspicions were greatly increased by the specifications USPS published recently, covering interconnection of carrier-provided transmission facilities with USPS-provided communications controllers in each of the 25 cities to be served initially by Ecom.

GTE Telenet Communications Corp., one of the vendors submitting comments on the specifications last week, chastised USPS for providing three public ports and three high-speed private ports at each serving post office. There is room for many more ports and they could be provided "readily," the company said.

By providing only three private ports, USPS is creating "an artificial scarcity," GTE Telenet added — one that may lead to higher revenue for the postal service, but is also likely to raise rates for Ecom users. This is because USPS plans to award each private port to the carrier that guarantees the highest amount of message traffic. "If the effect of this competition is to cause carriers to commit to [message volumes] significantly in excess of the actual volumes realized, the carriers will be obliged to increase their charges ... to users," GTE Telenet pointed out.

Other Complaint

The company also objected to a requirement that carriers that lease private ports must furnish and maintain the interface circuitry at their own expense. GTE Telenet said it would have to spend $200,000 to provide X.25 interfaces, compatible with its network, at the 25 serving post offices. "Given that Ecom is an untested service ... and the quality of service is within the exclusive control of USPS," the company observed, it is unlikely that commercial EMS vendors will be willing to make this kind of commitment, particularly "if the carrier is independently obliged to guarantee certain traffic minima "in order to obtain a private access port."

When the governors of the postal service announced last August that Ecom would begin next January, they said commercial carriers would provide the transmission services; however, USPS would be allowed to lease its own circuits and provide a competing service if there was a "demonstrated need."

In any event, it looks as though another protracted fight is in the offing — one that could delay Ecom's start-up beyond next January.

Poll: DPers Need Challenge, Recognition

(Continued from Page 1)

zation as a whole, Katzenmeyer noted. Senior DPers, such as experienced systems analysts and project leaders, get grouchy when administration bogs down — especially as user departments fail to tell the DP staff what they want from systems.

Katzenmeyer said he works for high morale among junior DPers by explaining to them the significance of applications and routine maintenance. To boost spirits among senior DPers, he tries to smooth the process by which user departments approve and accept the systems projects his lieutenants lead.

At Avondale Mills in Sylacauga, Ala., DP manager Morris Ansley said lack of direction was the main cause of low morale among junior DP personnel and lack of recognition was the main cause of grumbling among senior staffers. So he provides direction to the former and recognition to the latter in working to raise morale.

Ansley said he also meets regularly with other managers in his company to discuss techniques for building motivation and sense of fulfillment.

Lagging Salaries

At Multimedia, Inc. in Greenville, S.C., DP Director William McCoy called lagging salary growth the most common cause of low morale among senior DP professionals. But most of the other survey respondents indicated their veteran subordinates worry more about promotions than salary raises.

The survey's only government-sector respondent, Don Doescher, said low morale among senior DPers at Nebraska's Revenue Department was most commonly caused by a sense that careers have "dead-ended." The Lincoln, Neb., systems administrator said the main cause of low morale among junior DP personnel was frustration with disruptions in project priorities caused by changes in Nebraska's tax laws.

At Koracorp Industries, Inc. in San Francisco, MIS director Bob Whisten said entry-level programmers most commonly lose job enthusiasm because they are assigned routine tasks related to maintenance of existing software. Fresh from schools, Whisten explained, new programmers prefer — and widely expect — to tackle sophisticated software development assignments soon after they come on board.

Echoing this view, Star Supermarkets' Pawlick described a dilemma faced by many DP managers with small programming staffs. These managers find they cannot give bright entry-level programmers immediate development assignments because that would require transfer of veteran programmers from vital and hard-to-fill roles to temporary duties as trainers of the new hires.

In typical small organizations, DP managers can ill afford to swiftly coach young software talent into positions that call for much creativity and versatility, Pawlick pointed out. Instead, entry-level programmers must pay their dues by handling mundane software maintenance chores, inching their way into sophisticated projects on the basis of how they handle those chores.

At Concordia Publishing House in St. Louis, MIS director Robert S. Delorey said his approach to raising DP morale was to keep his staff of 50 challenged and feeling that they contribute significantly to the company as a whole.

Like most of the survey respondents, Delorey interacts with higher management or other departments in the course of trying to raise his staff's morale.

The president of Thrifty Corp. in Los Angeles regularly meets with the DP staff to discuss matters affecting morale, according to the retailer's DP director, Bill DiDominic. At Rockland Trust Co. in Rockland, Mass., William T. Malley is vice-president for both DP and personnel, so he concerns himself with morale throughout his company.

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* A subset of Information/System, a program product of the IBM Corporation.

DP Directory Lists NYC Users, Vendors

NEW YORK — *The New York Metropolitan Directory of Data Processing* is available from Computer Management Research, Inc.

The directory lists more than 6,000 computer users and more than 4,000 computer vendors in the multi-billion dollar New York City DP market. It also contains a listing of more than 10,000 computer executives and consultants, complete with addresses and phone numbers, the company said.

The directory retails for $187.50 and is available from Computer Management Research, Inc., Suite 1105, 373 Fifth Ave., New York, N.Y. 10016.

FAA Takes Steps to Prevent Possible Sabotage

By Marguerite Zientara
CW Staff

WASHINGTON, D.C. — Is the air traffic controllers' (ATC) union militant enough to sabotage ATC computer and/or radar equipment?

The Federal Aviation Administration (FAA) thinks it may be. "The possibility exists and we have taken steps to prevent it," FAA spokesman Fred Farrar explained two days into the strike. Among the preventive measures the agency took was one barring striking controllers from entering tower facilities.

Other security measures already in place were increased during the strike, he added, "but I can't say what for obvious reasons." Farrar did mention that door locks were increased.

In spite of the FAA's fear of possible sabotage, a representative of the Professional Air Traffic Controllers Organization (Patco) claimed those fears were unfounded. "There's absolutely no danger of that; we're not interested in destroying property at all," explained Patco member Michael Wood from Norfolk International Airport.

"The only law that we have broken and the only law that we intend to break is the unjust law that says we are not allowed to strike," Wood said. "The money spent on security at Norfolk International Airport is enormous and it's all wasted. If they'd used that money to pay us and to provide for the benefits we need, we wouldn't be on strike today," he added.

"[The FAA has] been preparing their security procedures and precautions for months," Wood claimed, adding, "They seem to be totally paranoid that we're going to destroy their property. We're not criminals, we're not hoodlums, we're responsible, mature, good American citizens who've been pushed to the wall by a reactionary employer."

Among the security measures the FAA allegedly took at Norfolk were installing new cipher locks, changing existing locks, posting signs warning that it is a federal crime to destroy public property, enlisting support from local law enforcement authorities and developing numerous security plans for securing their property and personnel.

Precedent Set

There is precedent for sabotage by air traffic controllers. Early this year the FAA suspended for 60 days a Kennedy International Airport controller accused of deliberately removing data from computerized radarscopes and contributing to the "potential endangerment" of a Soviet airliner [CW, Feb. 11, Oct. 6, 1980; Feb. 2, 1981].

Controller Gerald F. O'Brien, said to be the first controller ever charged with tampering with ATC equipment, reportedly altered data pertaining to an Aeroflot airliner.

Can U.S. Fly Without Patco?

(Continued from Page 1)

ferent opinion about the flying public's safety during the strike. "I think [the controlling during the strike] is a travesty," commented Michael Wood, Patco member at Norfolk International Airport in Virginia. "It's a shame the American public should be subjected to this sort of thing."

Controllers, who are striking for a better wage and benefit package as well as a shorter work week, have long decried the added hardship allegedly caused by antiquated third-generation computer-based radar information systems. They have complained of the danger of mid-air collisions stemming from short-term computer failures, a hazard the FAA claims is part of the job. With "rusty" supervisory personnel at the helm during the strike [CW, Aug. 3], controllers are even more concerned about air safety.

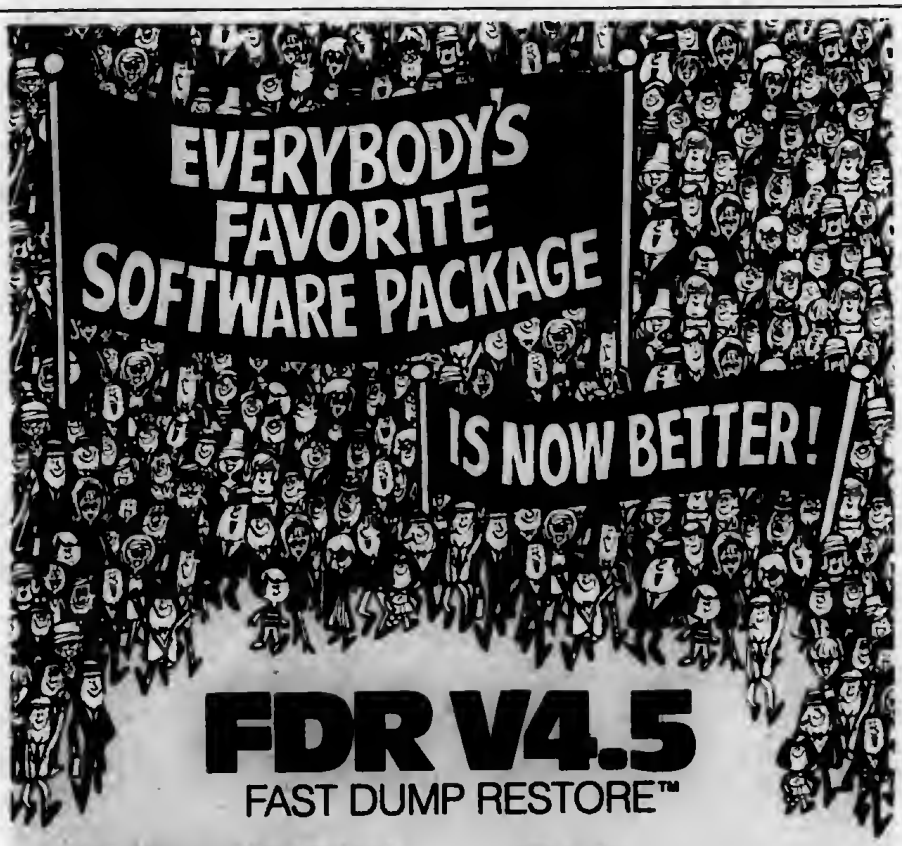
"For example," Wood explained, "at Norfolk, there is a man controlling traffic this week who has not controlled traffic in over eight years, and another who has not controlled traffic in over three years.

"I'm a full-time controller and if I take a two-week vacation, I am very rusty and unsure of myself when I come back," he said. "It takes a while to get back into the groove, to get the reflexes going again, the rhythm and everything else. A man who has not controlled traffic in over eight years is sadly incompetent."

With approximately 370 FAA-certified military controllers ready to step in and help if necessary, Patco representatives had some less-than-positive opinions about that plan, as well. "There is no criticism of [the military's] ability; they are just as able as civilian controllers," Wood said.

"However, they have not been trained to work with our equipment and with our procedures and they're generally not as familiar with the aircraft we work," Wood added. "It normally takes around three years to train a controller in a facility and if the FAA thinks they can stick military controllers in there and train them in a short time, they're in grave error."

Controllers who simply transfer from one airport to another take from one to two years to qualify at the new airport, he added.



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Vendors Compete for Spotlight at ACM

By Tim Scannell
CW Staff

DALLAS — If there was an overriding theme at the Association for Computing Machinery's (ACM) annual graphics conference and exhibition here last week, it was "anything you can do, I can do better."

More than 130 companies filled the 100,000 red-carpeted square feet of exhibit space at the Dallas Convention Center and nearly every one unveiled a new graphics product or technology. The introductions there ranged from what was called the world's first three-dimensional graphics and imaging system to a digital imaging system touted as "the best little film recorder in Texas."

Lucitron, Inc. introduced the Flatscreen, which it said is the first commercial flat display screen. The device uses patented gas-electron-phosphor technology to produce computer or television information on a 3-in.-thick screen. Currently, the viewing area is about 4 sq ft and can only produce one color, but larger screens and full color will be available in the near future, according to Alan Sobel, cofounder and vice-president of operations for the Northbrook, Ill., firm.

The first user of the unique screen will be the U.S. Navy, which is scheduled to receive a unit in January. While the government is paying about $30,000 for the privilege of being the first one on the national block to use Lucitron's device, eventually the displays will cost about $5,000 for the monochrome and $9,000 for the color versions, Sobel explained.

Genisco Computers Corp. literally brought a new dimension to three-dimensional graphics by introducing a graphics and imaging system that uses a mirror to create a holographic-like display. By reflecting a standard CRT image in a vibrating, variable focal length mirror, the Spacegraph system produces a graphics image that appears to be suspended in space. The timing of the image is under control of a computer developed by Genisco and is coordinated with the position of the mirror.

The device, which plays on the retentive characteristics of the human eye, allows the viewer to view to either side of the graphics object by as much as 30°, a spokesman said. Spacegraph and true three-dimensional displays are aimed at a number of industry areas, especially seismology and computer-aided design.

Genisco also unveiled at the ACM show a color/monochrome terminal that features a low internal instruction execution time and the ability to perform distributed processing functions. The G-6100 and G-6110 terminals include a resident graphics operating system and a Fortran cross-assembler for user programming. They are priced from $25,000 and $20,000, respectively.

Other Products

• A multitasking operating system from Chromatics, Inc. for its MC68000-driven CGC 7900 color graphics computer. The operating system supports Pascal and C language compilers and includes an assembler and text editor, a spokesman explained. The system, called Idris, costs $2,000 and the language compilers are priced at $1,000 each.

• Advanced Electronics Design, Inc. of Sunnyvale, Calif., unwrapped an intelligent, full-color graphics display system designed to add imaging capabilities to local or remote computers. The AEDS12 features a half-sec image transfer, continuous joystick panning. It emulates Tektronix, Inc. storage terminals and communicates either through an RS-232C or 20mA current loop.

• Nicolet CAD Corp. announced two intelligent output workstations that use diskettes to output directly to pen plotters, photoplotters or numerically controlled paper tape punch. The Models 40 and 41 are configured with magnetic tape and disk drives. The Model 40 sells for $24,950 while the Model 41, with disk drives only, costs $18,500.

The Concord, Calif.-based firm also announced for the liquid crystal display market a CAD drafting system that can be used in conjunction with a tablet to digitize artwork to scale. The LC 52/54 system costs $49,950.

Calcomp Debuts

• California Computer Products, Inc. introduced a 36-in.-wide electrostatic plotter/printer and a line of raster refreshed interactive graphics displays. With a print speed of 777 line/min, the plotter printer can run translucent paper and clear film without equipment modifications. The Model 5500 can be interfaced to DEC, Data General Corp. and Hewlett-Packard Co. computers.

Calcomp's Vistagraphic 3000 series of raster refreshed displays all feature 19-in. viewing screens with four different resolutions and have the same display processor as the company's previously announced Vistagraphic 1000 series vector generation displays, a spokeswoman explained. The Vistagraphic series is priced from $33,000.

• Hitachi America, Ltd. unveiled a high-resolution color monitor, called the HM-3619, which has a resolution convergence set by the factory and that reportedly requires no adjustment due to temperature fluctuations or other environmental conditions.

• Lundy Electronics and Systems, Inc. introduced an interactive three-dimensional graphics workstation, as well as a series of raster-scan graphics terminals.

The Ultragraf workstation employs a bit-slice microprocessor and delivers up to 128K words of buffer and refresh memory. It has a 21-in. display, dual buffering and a variety of control panel options. The series of raster-scan graphics terminals are a compatible extension of Ultragraf and feature local intelligence, greater interactivity between user and display and reduced mainframe communications. There are three members in the 5000 series and they all support most high-level graphics software, a spokesman for the Glen Head, N.Y.-based firm said.

Marc Software

• Marc Software International, Inc. announced that, due to a software licensing agreement recently signed with CAD-Systems, Basel, Switzerland, it will have North American and Japanese marketing rights for the ITS-10 three-dimensional CAD software package. ITS-10 runs on a number of 32-bit computers, including those from Prime Computer, Inc., DEC and IBM, and will cost $87,500, or $2,750/mo. A key feature of the

Products, Technology Make Splash at ACM Siggraph/81

(Continued from Page 1)

two-day educational courses and a variety of 30-minute vendor forums covering such things as ergonomics, business graphics and hardware trends.

Walking down any one of the convention floor's nine red-carpeted aisles, graphics aficionados found it hard to resist many three-dimensional and whirling color patterns displayed on the hundreds of CRT screens. Visual movement was the name of the game and nearly every vendor took full advantage of its system's capabilities.

The ACM hoped to draw at least 8,000 business, scientific and entertainment people to the four-day show; at the end of the second day, with about 6,200 people registered, it seemed well on its way to reaching that goal. Earlier in the week, Siggraph officials expressed some worry that the air traffic controllers'strike — which began the day the show opened — might have some effect on the attendance figures.

Nevertheless, attendance at this year's conference, by both attendees and exhibitors, grew significantly compared with past years, a fact that conference cochairman Tony Lucido credited to graphics' maturation process.

The prices of graphics systems have dropped and new technologies, such as raster scanning, have emerged. In addition, graphics software packages have become more versatile. Systems are sharing the same programs and a lot of these programs are "canned and ready to run," Lucido said.

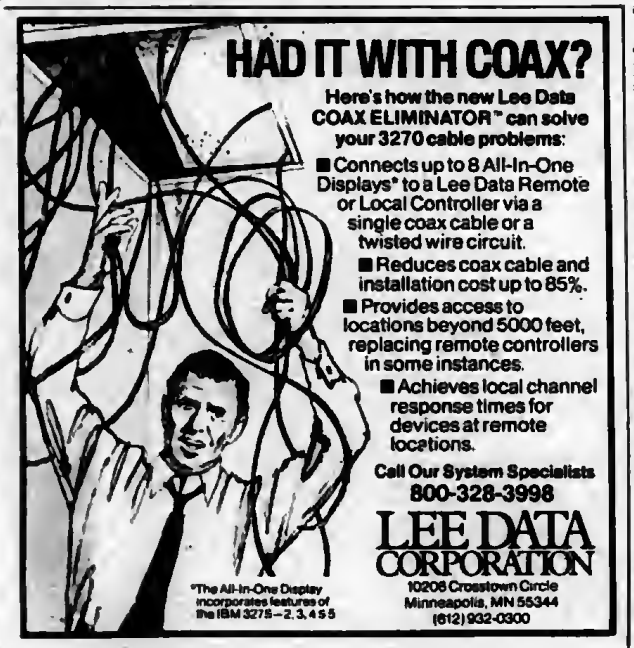
In terms of attendance and financial clout, users needing industrial applications seemed to be a major force at this year's Siggraph. "That doesn't mean the artists aren't an important segment," Lucido commented. "It's just that they're probably outnumbered by the business world."

If there is one thing that most vendors and the ACM would like to do, it is to convince business middle managers that sophisticated graphics can be a worthwhile part of the management information systems (MIS) effort. Unfortunately, most managers remember what happened about a decade ago when graphics was oversold with promises and touted as an invaluable, almost mystical management tool.

"Well, that failed. The technology wasn't there and the predictions were a little bit overblown," Lucido, who is a senior software engineer at Intercomp Resource Development and Engineering, Inc., said. "We kind of fell on our face with graphics."

A major thrust of Siggraph's educational effort is to show middle managers that graphics systems are slowly being integrated and successfully working with MIS and data base management systems (DBMS).

"I think you have to look at it as MIS systems being converted to 'total information systems,'" Lucido explained. "The middle manager becomes a part of that flow and a major graphics business segment."



Graphics Meet

software is its ability to handle solids modeling, a spokesman pointed out.

• Versatec, Inc. introduced a variety of products, including a random element processor that completely offloads host computer data ordering and raster conversion; random plotting software that represents data in element form rather than traditional vectors; a plotting workstation that uses CRT-displayed menus to simplify the creation of canned sequences and graphics manipulation; and a remote plotting controller that emulates a multileaving remote job entry workstation to provide remote electrostatic plotting and printing.

Nicolet Zeta

• Nicolet Zeta Corp. unveiled an on-line/off-line plotter workstation designed to drive the company's 36-in. and 54-in. drum plotters. The Zeta C63 comes with a tape drive, keyboard and large integral CRT and costs $19,900.

• Integrated Software Systems Corp. (Issco) announced that its widely used Tell-A-Graf and Dissplа software have been interfaced to graphics terminals just announced by Tektronix, Inc. and Hewlett-Packard Co. The Tektronix terminals are part of that firm's 4110 series, while the HP interface is for the HP 2623A terminal.

Fire 240

• And finally, wrapping up on a Lone Star note, MacDonald Dettwiler and Associates Ltd. presented its film recorder, Fire 240, which takes digital information from a computer and translates it into a picture on film. The difference between this unit and similar units is reportedly its size, which is comparable to a standard office copier, a spokeswoman stated.

CW Photo by T. Sizemore

Exhibits from 130 companies filled the Dallas Convention Center at Siggraph/81. Megatek's Richard Greenfield demonstrates the "big picture."

SEL, Chromatics Debut Services

DALLAS — Caught up in the announcement frenzy, a number of firms exhibiting at the Association for Computing Machinery's (ACM) Siggraph/81 conference used the show as a platform to announce new services.

One of the more significant announcements came from Systems Engineering Laboratories, Inc. (SEL), which said it is furthering its push into graphics by supporting a variety of other vendors' products.

Under the umbrella of its graphics support program, which consists of software, most computers and graphics devices, SEL will offer Megatek Corp.'s Template two- and three-dimensional graphics software system, Tektronix, Inc.'s Plot 10 software, Benson-Varian Corp.'s Dataplot III, Versatec, Inc.'s Versaplot and the U.S. government's graphics compatibility system (GCS).

SEL decided to offer its "support platform" after surveying its customer base and discovering that more than three-quarters of the users have some kind of graphics software or hardware on SEL 32-bit computers. Most are dealing with four or five different vendors to achieve their graphics goals, SEL Product Manager Mike Dempsey said.

Leasing Program

Chromatics, Inc. used the Siggraph springboard to announce that it will be the first firm specializing in color graphics to offer a leasing program covering all of its equipment.

Effective immediately, the firm is offering leases on its CG and CGC series computers for terms of 12, 24, 36, 48 or 60 months. Optional maintenance contracts will be available in certain parts of the country.

Additional information can be obtained from the company's headquarters at 2558 Mountain Industrial Blvd., Tucker, Ga. 30084.

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HP Enters Small Systems Fray With Eight-Bit Business CPU

By Jeffry Beeler
CW West Coast Bureau

CUPERTINO, Calif. — Hewlett-Packard Co. became the latest vendor to enter the mounting "personal" computer fray when the company last week announced an eight-bit small business processor that reportedly runs under Digital Research, Inc.'s CP/M operating system.

Priced at under $7,500 for an entry-level configuration, the Model 125 "personal office system" is aimed primarily at business executives and professionals who need a dedicated computing aid that doubles as a word processing station, remote communications terminal and hard-copy graphics tool.

Although designed primarily for local processing, the single-user system also comes with a so-called Link/125 software package that enables the 125 processor to communicate asynchronously at up to 9,600 bit/sec with either an HP 3000 series machine or a large-scale host mainframe, a company spokesman said.

Hewlett-Packards HP 125

Key Packages

The Model 125 also boasts four other key application software packages including:

- Visicalc/125, which reportedly simplifies financial calculations, planning and analysis.
- Graphics/125, which converts tables of data into graphs as well as pie and bar charts.
- Word/125, a word-processing program that also allows users to do bulk mailings.
- Basic/125, an interpretive programming language developed by Bellevue, Wash.-based Microsoft, Inc.

In addition, the 125's operating system allows users to gain unrestricted access to the industry's extensive installed base of CP/M-compatible application programs.

Characterized as the industry's only business-oriented "personal" computer system to support both CP/M and Visicalc, the 125 falls into roughly the same product class as the Apple Computer, Inc. Model II, Xerox Corp.'s latest low-end offerings and Data General Corp.'s recently announced Enterprise machine, an HP source said.

The 125 system line consists of two models, both of which sport identical hardware configurations except for their mass storage units. The 125/10 incorporates dual 5¼-in. minidisks, each capable of storing up to 250K bytes, while the 125/20 comes equipped with dual 8-in. floppy disks, for a total storage capacity of 2.4M bytes.

The Model 20 allows the 125 to exchange programs with any CP/M-based system incorporating 8-in. floppy disks and is intended mainly for users who must deal with large transaction volumes or who want to communicate with large host mainframes.

Both the models 10 and 20 can expand to accommodate as many as eight disk units, although few users are likely to require configurations that large.

Like its sister system, the Model 20 is built around two Zilog, Inc. Z-80A microprocessors, both of which lie inside the small business system's video display terminal. One of the devices is used exclusively for executing user programs and comes with 64K bytes of nonexpandable main memory.

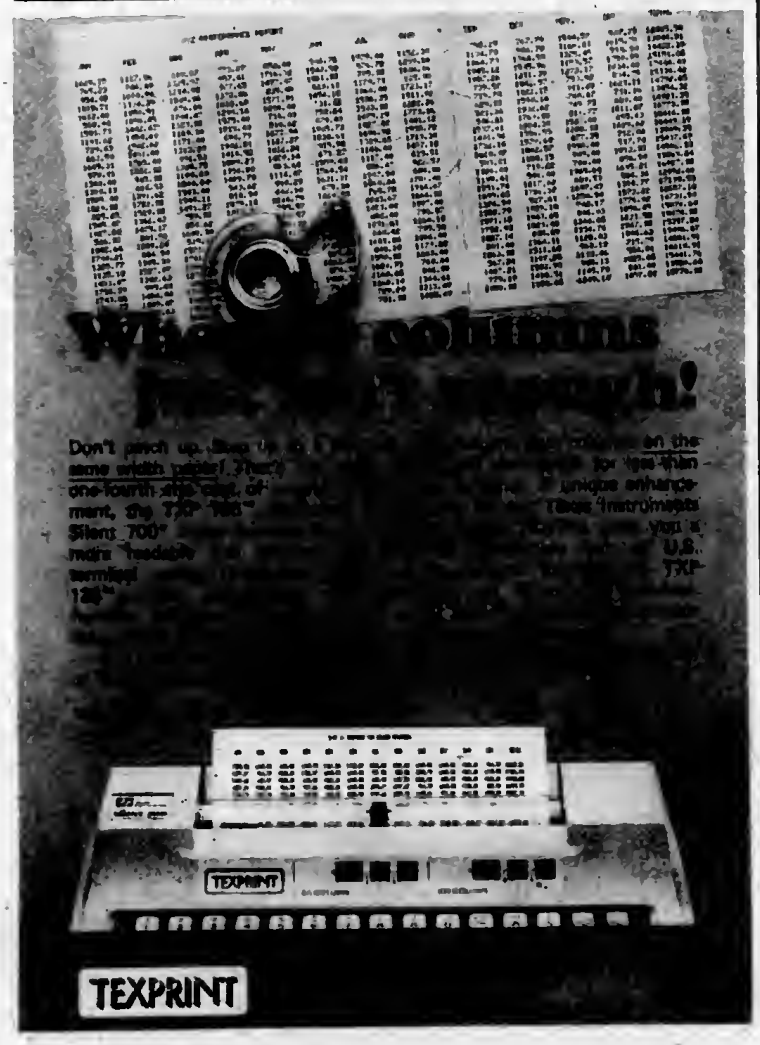
The other device is dedicated to terminal processing functions and works entirely independently of the system processor.

'Soft Keys'

Rounding out its hardware configurations, the 125 incorporates a typewriter-style keyboard with eight programmable "soft" keys and a 24-line display terminal that stores up to five pages of text.

An entry-level 125 system with a 64K-byte processor, dual 5¼-in. minidisk units, two communications ports, the CP/M operating system and a built-in 80-char./sec thermal printer costs $7,460. The five accompanying application packages are sold separately and range in price from $125 to $500 each.

Deliveries of the 125 system take six weeks from HP at 1507 Page Mill Road, Palo Alto, Calif. 94304.



HP Beefs up Model 250 Line; Cuts Price 20%

By Jeffry Beeler
CW West Coast Bureau

CUPERTINO, Calif. — Hewlett-Packard Co. laat week expanded its Model 250 small business systems line with two additional models that significantly improve the product family's performance while cutting its price by an average of 20%.

Both additions to the 250 series, the Models 30 and 35, provide a graphics and text-processing capability — features that the HP amall business systems line previously lacked. The 250/30 and 250/35 also boast a synchronous data communications capability that allows the systema to double as virtual terminals, transmit files and download programs to a host mainframe in a 3000 series-based distributed processing network.

The original member of the 250 family, by contrast, supported only asynchronous communications, according to an HP spokesman.

The key to the 250 series' newly acquired business graphics, text processing and aynchronous communications capabilities lies in its application software packages. Three such packages made their debut at the same time as the Model 30 and 35 hardware.

The packages include:

- Text/250, which interactively produces reports, memos and other office documents with the help of either a high-speed or letter-quality printer.
- Decision Support Graphics/250, which uses HP plotters to convert data from tables to multicolor hard-copy graphics like bar charts, pie charts and line drawings.
- Distributed Systems/250, an interactive utility that allows the two small business computer models to communicate with HP 3000 series network hosts while emulating RJE and IBM 2780/3780 terminals.

(Continued on Page 12)

The Hewlett-Packard 250 Series

Module Boosts HP 250 Memory

CUPERTINO, Calif. — A mass storage module that integrates a Winchester disk mechanism with a ¼-in. cartridge tape unit has boosted by 33% the amount of external memory capacity available with Hewlett-Packard Co.'a 250 series of small business systems.

The module, whose debut coincided with last week'a expansion of HP'a 250 family, accommodates up to 16M bytes of disk storage — a 4M-byte increase over the amall aystem family'a previous maximum

Billed as HP'a lowest priced disk product to date, the Model 7908 mass storage system also incorporates an intelligent controller and a tape drive unit that accepts two varieties of 4-in. by 6-in. cartridges, one with 150 ft of recording medium and the other with 600 ft. The 150-ft cartridge atores up to 16.7M bytes; the 600-ft version, as many as 67M bytes, an HP spokesman said.

With either type of cartridge, the built-in tape unit serves primarily as a backup for the 7908's disk system. HP credited the backup storage facility with recording data up to 10 times faster than its companion Winchester system and with copying disk-stored files at 2M char./min.

In its disk system portion, the mass storage module gains access to data in an average of less than 50 msec and transfers up to 537.6K byte/sec, the spokesman said.

Equipped with a self-test and diagnostic capability, the 7908 typically sells for $9,900. With the tape unit excluded, the product price drops to $7,900. A pack of five 16.7M- or 67M-byte tape cartridges costs $125 and $165, respectively.

First customer shipments of the 7908 are alated to begin next month from HP at 1501 Page Mill Road, Palo Alto, Calif. 94304.

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TI Cuts Prices on Omni 800 Terminals

HOUSTON — Texas Instruments, Inc. (TI) recently cut list prices up to 17% on its Omni 800 Model 840 keyboard send-receive (KSR) data terminal and Models 840 and 810 receive-only (RO) printers.

At the same time, the firm also announced the addition of several new options and four additional option packages for its Model 840 KSR and RO units.

Ranging from 7% to 17%, the price reductions affect all unshipped backlog, new orders and existing equipment agreements, a spokesman said. Under the new pricing structure, the Model 840 KSR, formerly $1,345, now costs $1,245; the Model 840 RO costs $995 down from $1,195; the Model 810 RO is reduced 13% from $1,895 to $1,645; and the Model 810 package is dropped from $2,155 to $1,905.

The reduced prices are possible because of innovations in TI manufacturing and production technology, the spokesman stated.

The new 840 options include a device forms control, costing $100; an adjustable tractor drive costing $50, which replaces the 840's standard friction feed; an adjustable tractor drive that can be added to the friction feed, priced at $125; and an 18-key numeric keypad, costing $75.

The new option packages consist of a Model 840 RO friction package, which costs $1,265; an 840 RO tractor drive package, which sells for $1,315; an 840 KSR friction package, which costs $1,645; and an 840 KSR tractor drive package, which costs $1,695.

The 840 KSR packages both include the basic high-speed transmission data terminal, an additional 2,000-char. first-in first-out buffer, an 18-key numeric keypad, a forms control option and an RS-232C cable. More information on the price cuts can be obtained from TI's Digital Systems Group, P.O. Box 202146, H-594, Dallas, Texas 75220.

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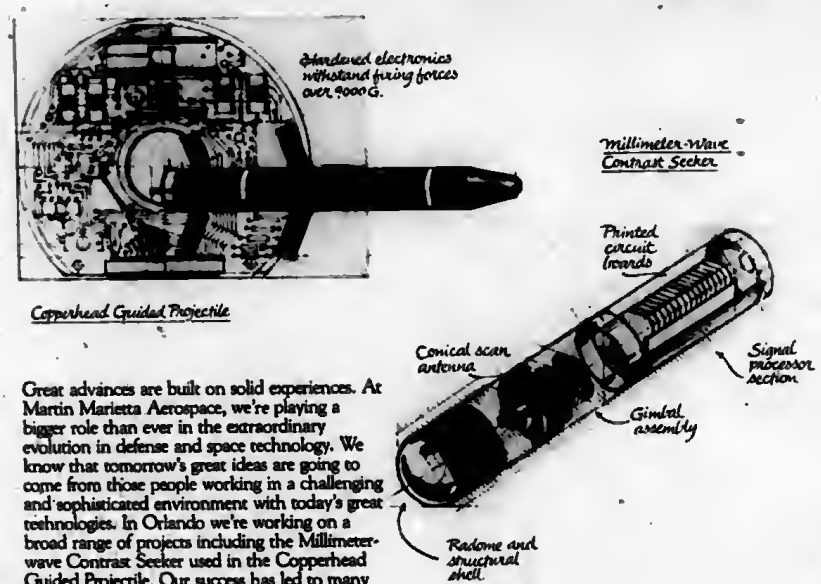

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HP Bolsters Model 250 Line

(Continued from Page 11)

Intended primarily for nontechnical office workers both in small businesses and in the branch locations of large companies, the 250/30 and 250/35 also come with previously unavailable system software that allows the two models to support HP's latest mass storage unit, the source said. Designated the Model 7908, the just announced product combines a 16M-byte Winchester disk mechanism with a ¼-in. cartridge tape system that holds either 16.7M bytes or 67M bytes of backup storage. Previously, the 250 family's mass storage capacity was limited to a maximum of 12M bytes.

In hardware, the 250/35 closely resembles the HP small business system family's original member, which integrates all its equipment modules in a single, desk-like enclosure. The main difference between the Model 35 and its older twin is that the former system has been enhanced with the addition of the 7908 and the 250 line's three recently introduced application software packages.

In its original form, the 250 series lacked all these hardware and software features, although they can be retrofitted to the systems family with the help of an optional upgrade kit, the spokesman said.

Model 30

The Model 30, by contrast, incorporates a repackaged version of the 250 family's original CPU and, unlike the line's existing member, reportedly permits all its workstations to be placed several feet away from the central processor.

A typical 250/30 configuration with 160K bytes of system memory, 32K bytes of user memory, 16M bytes of disk storage, a 67M-byte tape unit, a personal workstation and four communications ports costs $22,500. A comparably equipped 250/35, with no ports, sells for $25,600, with a five-port interface board available for $2,205.

Main memory increments of 64K bytes and 128K bytes go for $1,500 and $2,000, respectively, compared to $2,500 for each additional personal workstation. First copies of the 250 family's latest three application packages range in price from $500 to $900 each.

Deliveries of the 250/30 and 250/35 begin in October from HP at 1507 Page Mill Road, Palo Alto, Calif. 94304.

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Net to Link 40 Cities

Nationwide Data Net Planned by Isacomm

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Plans for a nationwide data communications network offering wideband transmission end to end via microwave local loops were unveiled here recently by ISA Communications Services, Inc. (Isacomm).

The carrier plans to interconnect a total of 40 cities, including a number of medium-size ones such as Tacoma, Wash., Cincinnati and Morristown, N.J. In at least 30 of these, Isacomm would provide microwave-based local-distribution facilities capable of carrying up to 1.544K bit/sec to and from the user's doorstep.

The specific services to be supported include data transmission, document distribution and video teleconferencing. Aside from 1.544K bit/sec, the network will also provide service at 56K, 112K, 224K and 448K bit/sec.

The local distribution facilities Isacomm plans to provide consist basically of paired 1.8M bit/sec microwave channels, through which the user will be linked to a local network node. A small-diameter dish antenna, typically on the roof of the user's building, will be cable-connected to his terminal. Time division multiplexing (TDM) will control usage of the node-to-user channel, while time-division multiple access (TDMA) will be employed on the user-to-node channel. Speeds of up to 1.544M bit/sec will be achievable in either case.

Resale Carrier

Isacomm, headquartered in Atlanta, is a resale communications carrier owned by Insurance Systems of America, Wausau Insurance Companies and American General Corp. The present network, operational since last April, interconnects five sites via satellite circuits leased from Satellite Business Systems (SBS). Wausau Insurance is now using this network for bulk computer-to-computer data transfer at 1.544M bit/sec. Early next year, one of Isacomm's customers, Maryland Casualty Co., will begin using the network for teleconferencing and high-speed document distribution.

In addition to these applications, Isacomm is working on a number of others, including digital facsimile transmission at 56K bit/sec. Meanwhile, the network is being expanded.

Ten cities are scheduled to be interconnected by the end of this year. Only one of them, however — Atlanta — will provide digital termination service and that will be only a prototype system. By the end of 1982, Isacomm plans to be serving a total of 22 to 28 cities, of which four (Atlanta, New York City, San Francisco, and Chicago) are scheduled to have DTS facilities. By January 1984, Isacomm hopes to have 40 cities on-line, and by February 1985, 30 of these would be offering DTS.

Plans for the new network were unveiled in a voluminous application Isacomm filed at the Federal Communications Commission (FCC). The company requested the frequencies needed to operate a "digital termination service" (DTS), the official name for a service first proposed in 1978 by Xerox. Isacomm's implementation is virtually identical to Xten, the system proposed by Xerox.

Last May, Xerox decided it would neither proceed with Xten nor become a DTS carrier, but a number of others, including AT&T, have expressed interest in providing the service.

Isacomm is the first organization to request a radio frequency allocation. More applications are likely to be filed shortly, though, since the frequencies earmarked for DTS will allow only a limited number of microwave local-distribution systems in each metropolitan area.

More Economical

For data communications users, DTS is significant. It promises to eliminate their dependence on analog local loops. Also, the new technology may be more economical than the Dataphone Digital Service (DDS) local-loop facilities AT&T now offers.

According to Isacomm, a user desiring 56K bit/sec service end to end between Houston and Atlanta would pay AT&T more for the DDS local loops than he would pay Isacomm for the intercity satellite circuit.

Deregulate Slowly, Committee Told

WASHINGTON, D.C. — Congress should deregulate only "one or two" markets rather than the entire telecommunications industry all at once, the Senate Judiciary Committee was told here last week.

The committee, chaired by Sen. Strom Thurmond (R-S.C.), has been holding an extended hearing ostensibly devoted to "monopolization and competition in the telecommunications industry." But actually the hearing is a rallying point for opponents of S.898, the Communications Act rewrite bill recently passed by the Senate Commerce Committee. Thurmond and company are clearly building a hearing record that they hope will torpedo S.898 when it comes up for a final Senate vote within the next few months.

The recommendation to deregulate AT&T more slowly than is specified in the current version of S.898 came from John H. Shenefield, associate attorney general in the Carter administration. He also said:

• Congress can adopt new telecommunications legislation without weakening the Justice Department's demand, in its pending antitrust suit against the phone company, for divestiture of key parts of the Bell System.

• Congress has the power to cancel AT&T's 1956 Consent Decree (as the Senate Commerce Committee has done in S.898). But this should happen only after adequate safeguards are provided, Shenefield argued.

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Firm Offering Free IBM CICS Courses In Effort to Recruit Skilled Programmers

By Bob Johnson
CW New York Bureau

NEW YORK — Courses in IBM CICS programming are being given to job applicants here by a local DP recruiting firm for just the cost of manuals and materials.

In an effort to fill a number of job openings for skilled CICS programmers, Data Executives, Ltd. has begun offering 16-week courses, one evening per week, in CICS command-level skills to all interested applicants. Students have access to an IBM 370/158 CPU at a nearby service bureau, where hands-on lab sessions are conducted.

The courses are being taught by three full-time CICS programmers hired by the firm and is open to applicants who can demonstrate a "good track record" in OS Cobol and who can pass an interview with Data Executives' screening committee.

Although Data Executives gives no job placement guarantees, the firm said it expects this type of training can boost a programmer to the senior level with an average salary increase of $6,000 to $8,000 annually.

Training Skills

Joseph Sabrin, head of Data Executives, said many programmers have been coming to his recruiting firm because of the training. "These are people who can't get skills because most companies are not progressive enough to offer them," Sabrin explained.

When asked why these programmers do not acquire the training on their own, Sabrin said that, first, it is usually more expensive to do so and, second, the quality of classes such as those found in private computer schools is not as good. "All computer schools should be closed," he declared.

Data Executives' cost for the training program is approximately $30,000, according to Sabrin, who said the classes were started to attract new recruits and to turn out applicants finely honed in CICS skills, skills he believes are extremely necessary for programmers.

"By 1985, 60% of all DOS/VSE installations will be using CICS," he predicted. "People who don't have these skills won't be able to compete."

The first session of classes began April 29. More than 40 people are now waiting to be admitted, Data Executives said. Applicants are under no obligation and are not expected to sign any agreements when taking the course; however, a fee of $50 is required, which covers the cost of two IBM manuals.

Peter Walton, a programmer/analyst at the American Automobile Association here and a student in the first session of classes, said the course has the potential for being very valuable to his colleagues interested in CICS. Walton, currently working in a Sperry Univac environment, said he believes knowing CICS will be of benefit to him in the future, considering the nature of the market.

Walton added that, although the lab sessions are not as advanced as he would like, the idea is sound — and he could not beat the price.

IBM to Allow Payroll Deductions For New York Black United Fund

By Bob Johnson
CW New York Bureau

NEW YORK — IBM has become the first major corporation in the metropolitan area to allow payroll deductions for its employees who wish to contribute to the New York Black United Fund.

The action is the result of negotiations carried on since January between IBM and the New York chapter of the fund. IBM thus becomes one of a small number of large corporations that voluntarily allow organizations like the New York Black United Fund to participate in their charity programs.

The New York fund is one of 12 Black United Fund chapters in the U.S. — nonprofit charity organizations started in 1979.

Major Breakthrough

Kermit Eady, executive director of the N.Y. fund, said the development is a major breakthrough in work place charities, and he "applauds" IBM for taking the lead in this area.

Eady added that the move is a tremendous inspiration for minority employees because it gives them an opportunity to contribute to the charities of their choice. He expressed a need for the black community to try to solve their problems on their own. "It is high time for the black community to look out for themselves," he said.

IBM's decision is the result of efforts by employees who were interested in having the fund participate in the company's charitable contributions campaign, a company spokesman stated. He added that organizations that meet certain criteria, such as being designated a charitable organization by the Internal Revenue Service, can be included in the campaign if employee interest is generated.

Approximately 25,000 people are employed by IBM in the New York metropolitan area, which includes facilities in Westchester County, N.Y., New Jersey and Connecticut.

IBM said it does not break down employees into specific groupings, such as minorities, so it could not give an estimate of how many employees might participate in the plan.

Eady said he was unsure of how much the fund would raise through the plan.

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Users to Fight Communications Rewrite Bill

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Many of the nation's major corporate telecommunications users were gearing up last week for an attack on S.898, the Communications Act rewrite bill recently passed by the Senate Commerce Committee.

Users are convinced that if the present bill is enacted, it will result in much higher rates for all users. They also contend that S.898 will put users even more under Bell's thumb than is allegedly the case right now.

To prevent this from happening, attorneys in various law offices around Washington, D.C., are drafting amendments for presentation on the floor of the Senate when S.898 comes up for a final vote in that chamber. The same changes will be presented to the House of Representatives telecommunications subcommittee when it begins considering a companion bill to S.898. Both actions are likely to occur within the next few months.

The growing involvement of companies like U.S. Steel, Ford Motor Co. and Westinghouse Corp. in the "great telecommunications policy debate" gives Ma Bell's opponents significantly greater resources and political clout. The big question, of course, is whether this increase in influence can match AT&T's. The question may well be decided by what happens to the upcoming amendments.

Surcharge Provision

One provision of S.898 that particularly bothers users, according to a source involved in the amendment-drafting effort, is section 202(3). It allows the Federal Communications Commission (FCC), "whenever necessary," to add a surcharge on local exchange access charges. He regards this provision as an open invitation to state regulatory commissions to underprice local telephone service and recoup the loss by imposing a surcharge on business users.

Another provision, Section 235(b), says that two years after the bill is enacted, the commission can deregulate any presently regulated offering, including terminal equipment, provided there is "effective competition." Under Section 228(g), the "separate sub" established to offer deregulated services is also allowed, two years after enactment, to own and operate its own transmission facilities.

Since AT&T will be free to charge whatever the traffic will bear for these deregulated offerings, users are likely to pay significantly higher rates, one source explained. But that is only part of the story.

Once AT&T converts presently regulated services to deregulated offerings, it no longer will have to honor all reasonable requests for interconnections — including those from vendors of competing services, explained Sen. Ernest F. Hollings (D-S.C.), who cast the lone vote against S.898 within the Commerce Committee.

Hollings, whose views are appended to the committee report on S.898, added that the phone company is also likely to place its newest network features in the unregulated rather than the regulated services. Many users needing sophisticated facilities, such as data communications users, would not be able to find alternative facilities and "would be at the mercy of the separate, unregulated affiliate," Hollings pointed out.

There is also "a very good chance the basic network will become outmoded" as a result of this transfer processing, Hollings argued, for, "as each innovation gets placed in the 'separate' affiliate, the basic public network will go downhill."

More Illusory

He admitted that before any transfers can take place, the FCC must find that effective competition exists, but contended that the authority "is more illusory than real."

Partly, this is because the bill "prevents the FCC from collecting information about the 'separate' affiliate's facilities," and partly because the commission must go through an "elaborate adjudicatory proceeding" before it can determine that a particular service is not subject to effective competition, Hollings said.

"Allowing the 'separate' affiliate to offer facilities before competition exists not only would harm the big, sophisticated users, but, more importantly, it would likely harm the everyday users of basic service," Hollings said.

"It would be a drastic mistake to misunderstand this point. These small users truly have no place else to go. It would be extremely unfortunate if legislation designed to enhance service actually caused the service we all rely on to deteriorate."

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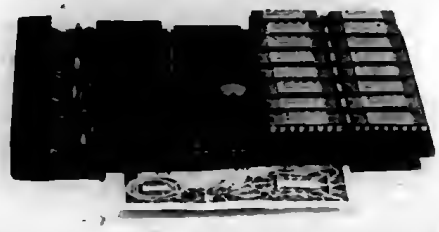

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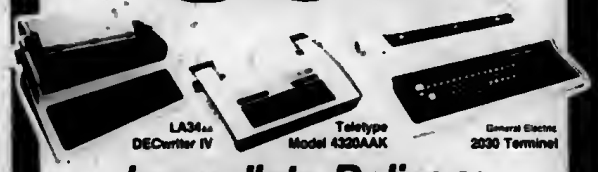

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Are Computers 'Impotent?' Kids Have the Last Word

By Eve R. Wirth
Special to CW

"Kids say the darnedest things" is a phrase coined by Art Linkletter many years ago when he worked with thousands of kids on the airwaves. But teachers, too, get their share of boners from the moppet set in their classrooms daily. In fact, many teachers keep a notebook of the funny expressions their moppets have written through the years. I'd like to share some of the ones pertaining to the computer industry; they were scribbled in all innocence by tykes of 10 in reports, tests and quizzes.

"After reading about what computer people do, I think they play a big fat roll in society, and the opportunities there are big and fat. They are so big and fat that when you work in computer, I read you can make alot analy."

Here is a strange bit of information by Todd. See what you make out of it: "It is known now that all the stuff computer men and women have to learn and know has now advanced to the point where it is no longer understandable."

Todd's twin sister Tanya's report has a twinge of confusion to it also. "Take a big look at those who work on computers. Do they know stuff like *input* and *output*? Do they know their buttons to press? Do they know which to press? No, you say to all these questions? Then for sure you are not taking a big look at those who work on computers."

No Chance

One tyke always liked dabbling in figures. He asked me a question on his essay that read: ". . . so will they ever reach where people do not any longer have to do without computers? I say the chance for this to happen is eggactly 999 our of a 100."

One little gal's father works with computers, and she reported the following: "My Pop is a computer man. He has been doing this since he came to New York from Richmond, Indiana, where my mom was prickmented with me. Before this she was prickmented, my Pop was unemplowed."

Tamara's brief statement concerning the importance of the computer industry is as charming as childhood itself: "A computer is a good invention. If we didn't have it, we would be back in the pre me times of history like in the A.D. or V.D. times."

Some kiddies are more inquisitive than others. Lee was such a student. She had apparently asked someone who had been in the throes of operating a computer many questions. She wrote: "One time I saw a guy do work on a computer and I wanted to know all about how it works, so he tried to show me. But it looked so complicated that it axally is not good for anything but doing computer work."

Question: What great contribution has the computer industry given to our business world?

Answer: "They give like 75¢ when business is hot. Other times they give 25¢."

'Everytime I just stop to think how thrilling this invention [computers] is, my left side gets a zillion goose bumps that go bumping all over me.'

If you've ever wondered what it really takes to be a top notch computer expert, here is your big chance at finding out from Karl: "It takes alot of high skill to be a expert computer worker. The smaller the pressing buttons, the higher the skills. The reverse of this is not true."

Do you want to know the difference between a female and male worker in the computer field? Joan explains it this way: "A man person who works on them is exactly the same as a woman who works on them. The only difference is in the you-know-where places we don't talk about on paper in school."

Often a child will get carried away with himself on a book report. Rosalie did just that: "Working on computers is a very serious thing. You have to put your hole into it for sure. Your eyes have to see the picture and your fingers know which things to poke right. Everytime I just stop to think how thrilling this invention is my left side gets a zillion goose bumps that go bumping all over me."

What better way to end our zany piece than with Gloria's important conclusion:

"The trouble with the world today is that people are not thinking along the lines of *impotence*. So many peopzle are doing things like with computers and other stuff, and they are impotent. People don't even know they are impotent. And here is something of an else to know — MEN ARE IMPOTENT AND WOMEN ARE LESS IMPOTENT. I am not a woman libberasst. But my Pop is the most impotent man around. Why? Becuase my Mom lets him be impotent. You should tell a man like this, 'You are the most impotent man in the world,' then he will get more work done. And that's why I think guys who work on computers are very impotent. The end — Gloria."

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Managers on the Move

Richard T. Faul

RICHARD T. FAUL has been appointed vice-president of management information systems at Waldenbooks, home-based in Stamford, Conn.

Faul was formerly senior manager, Information Systems Division, at Carter Hawley Hale Stores, Inc. He was responsible for corporate systems installations for its East Coast divisions.

Prior to that, Faul served as corporate director of merchandise information systems for Gimbels Corp.

•••

ARTHUR E. HUTT, an information systems specialist, has been named senior vice-president and manager of the data department at Bank Leumi Trust Co. of New York City.

Hutt has been involved for more than 25 years in the development and utilization of information processing systems, both as a bank executive and as a financial industry consultant. He has worked as manager of information systems planning for the City of New York, and has supervised the planning and installation of complex on-line computer systems in banking.

Hutt has participated in several industry association committees that were integrally responsible for the setting of technical standards and policies.

•••

HECTOR L. MASSA has been named manager in the DP, auditing division of Bank of America, with responsibilities in the fiscal and operational audit of the bank's Latin America/Caribbean Division automated facilities.

Massa joined Bank of America in 1975 as a DP audit ansiyst, serving in California until 1978, when he was relocated to the Latin American division, based in Panama, where he worked as a senior audit analyst.

Massa graduated from the University of San Francisco with a bachelor of science degree in business administration. He is fluent in three languages and is a Certified Information Systems Auditor.

Hector L. Massa

•••

MICHAEL RUETTGERS has been appointed vice-president, Information Services Division, for Keane, Inc. in Boston. In his new position, Ruettgers will have overall responsibility for information services branch operations.

Ruettgers came to Keane from Raytheon Corp., where he had worked since 1968 in various capacities. His latest position was that of general manager for Raytheon's Service Company's computer services operation, where he was responsible for more than $10 million in revenue and a staff of more than 250.

Ruettgers holds an MBA from Harvard Business School and is a graduate of Idaho State Univeraity, where he majored in marketing. He also attended Raytheon's Advanced Management Program.

Arthur E. Hutt

•••

FRANK DOMETROVICH has been appointed vice-president of data processing at LDM, Inc., in Covina, Calif.

Dometrovich joined LDM after serving more than 24 years at Burroughs Corp. In his new post, he will head up all DP services that the company provides, including operations, systems and programming, software utilities and facilities management.

•••

HARRY S. BOCK has been elected vice-president, director of manager information systems, at Florsheim Shoe Co. in Chicago.

Bock, former director of the company's DP division, was also sppointed to the Floraheim Board of Managers.

•••

THOMAS J. ESPOSITO has been appointed director of msnagement information systems at Apollo Computer, Inc. in Chelmsford, Mass.

Esposito brings to the Apollo management team eight yeara of experience in information systems, most recently at Prime Computer, Inc., where he managed corporate manufacturing systems.

•••

F. RICHARD LENNON has joined United Technologies' Essex Group as director of management information systems, based in Fort Wayne, Ind.

Lennon's professional experience has included employment with IBM's Research Division, Electronics Data Systems Corp. and Deloitte, Haskins and Sells. Prior to this move, he was affiliated with Southern Pacific Communications Co., Burlingame, Calif., where he was vice-president and director of management information systems.

Lennon received his bachelor of science degree in economics and finance from Villanova University. Upon graduation, he entered the Marine Corps, attaining the rank of captain. His tour of service included 13 months' duty in Vietnam.

•••

JAMES P. HENDERSON has been named director of management information systems at NL Industries, Inc. in New York.

Henderson joined NL as a software consultant in 1970. He has since served as manager of applications services, manager of technical services, manager of operations and associate director of systems/technical services.

Michael Ruettgera

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Comsat Wants Government To Drop Satellite Program Into Private Sector's Lap

WASHINGTON, D.C. — The Communications Satellite Corp. (Comsat) has asked the federal government to consider giving up its $450 million e year land observation and meteorological satellite programs to the private sector — possibly even to Comsat.

Speaking recently before e joint hearing of the House Space Science and the Senate Science, Technology and Space Subcommittees, Dr. Joseph V. Charyk, Comsat president end chief executive officer called for e unification of the government's nonexperimental earth-sensing satellites — preferably under the euspices of e privete operator.

Currently, both the Netional Oceanographic and Atmospheric Administration (Noaa) and the National Aeronautics and Space Administration (Nasa) operate two independent satellite systems that perform such sensing functions as weather and crop forecasting. However, the remote sensing and weather satellite programs have been under fire recently amid charges of gross ineptitude end mismanagement due to a lack of a clear government policy.

Unified Management

Under the Comsat proposal, tentatively lebeled Earthstar, the manegement of these satellite systems would be unified, elimineting the need for duplicate facilities.

"The earth's environmental processes are such that atmospheric, earth and oceanic processes are intimately intertwined," Charyk said last month during the hearing. "It is important that the collecting systems . . . be integrated as a part of a global environmental observing system."

Charyk noted that the privete sector can more effectively and more economically meet government and commercial needs as e result of its experience in delivering time-dependent data to paying customers.

The private sector's vigorous marketing approach would also "accelerate the commercialization of remote sensing epplications . . . strengthening U.S. leadership in commercial space epplications." This is an important point, Charyk said, since there is e rising foreign effort to capture the earth-sensing market.

While a firm such as Comsat could adequately handle Noaa's and Nasa's satellite obsevation activities, the government would still have to play e major role in the operation, the Comsat head noted. Earthstar would probably not be successful financially unless the U.S. agreed to buy significant portions of the dats produced and to contribute to the system's development through further research.

Although Charyk called for prompt ection from Congress on the satellite business takeover, more than likely there will not be any quick answers from the government on Comsat'e proposal. Under the plan, Comsat first would have to review e multitude of facilities connected with the satellite programs. The company would then have to negotiate with the government for e purchase price, e spokesman said.

UK Slams AT&T's Videotex Standards

WASHINGTON, D.C. — The battle over U.S. videotex and teletext standards heated up recently when the British charged that the standard proposed by AT&T — backed by the French and Canadians — would increese the cost and complexity of teletext terminals.

AT&T's Presentation Level Protocol (PLP) "was designed for interactive videotex and is not suitable for teletext development in the U.S.," the United Kingdom Teletext Industry Group said. "We understand this protocol has been accepted by [the Canadians and French] largely to achieve compatibility with . . . AT&T.

"However, the result eppears to be e teletext standard which will require decoders so complex that the lowest level (mosaic) decoder will be approximately four times as expensive as the lowest level British decoder end approximately three times as expensive as the British Level 3 (DRCS) decoder, even though the latter would provide far more sophisticated graphics display."

Generating Graphics? Enter a Contest

FRAMINGHAM, Mass. — Creators of computer-generated graphics who would like to see their work displayed on television are invited to enter a contest sponsored by *Computerworld TV* here.

The weekly TV news magazine for the computer industry is soliciting "interesting, entertaining and creative" graphics for use on its program, which currently is shown in 13 major TV markets across the country.

Individuals, groups or corporations are invited to enter. The graphics must run between five and 10 seconds in length and be submitted on 16mm film or any standard format videotape.

Entries will be judged by *Computerworld TV*'s producers on the basie of originality, entertainment value, ertistic merit, suitability for broadcast, interesting or unusual use of computers in development and overall "impressiveness."

The deadline for entries is Dec. 31. Those selected as semifinalists will be shown on the program, between features, end the entrants will be given eppropriate credit.

A complete set of rules and an entry blank may be obtained by contacting *Computerworld TV* Graphics Contest, P.O. Box 880, Framingham, Mass. 01701.

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The 743's easy-to-use typewriter-like keyboard allows airship technicians to conveniently enter message data which is transmitted to a host computer located in the blimp's passenger area. Then, with a single command on the 743, the designated messages are lit up on the *AMERICA's* 7,560 display lamps, illuminating the sky with color and action for after dark audiences everywhere.

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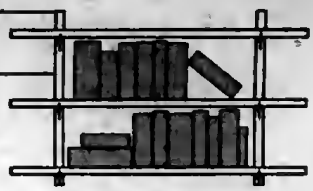

This monthly column describes a variety of recently published books of interest to Computerworld *readers. The books can be purchased or ordered at most bookstores;* CW *does not sell books.*

All inquiries for further information about the books should be directed to the publishers.

INVITATION TO FORTH
By Harry Katzan Jr.

This book covers Forth, the latest rage in languages, in a nonhardware- or software-specific manner, as a user-oriented tool suitable for large or small computers. Its coverage is thorough, ranging from programming details to control structures and information management. A solid reference book for anyone interested in Forth from the author of *Invitation to Pascal* and the forthcoming *Invitation to Ada*. Index.

Hardcover, 232 pages, $17.50. Petrocelli Books, 1100 State Road, Princeton, N.J. 08540.

CREATING AND PLANNING THE CORPORATE DATA BASE SYSTEM PROJECT
By Leo J. Cohen

Provides a formal approach to the data base system project. Outlines and thoroughly details seven essential steps in project development, with the aim of defining the data base system problem environment and designing a cost/benefit project environment. Step-by-step guide to project staging.

Hardcover, 312 pages, $34.95. Mountain House Publishing, Inc., RR 1, Box 433A, Waitsfield, Vt. 05673.

TAMING YOUR COMPUTER: A Guide for Business and Professional People
By Jerome Kanter

Designed for the business manager with no computer expertise, this handbook provides, in familiar business terms, practical information on every phase of business computer applications. Includes an introduction to computer systems; examples of business applications; management principles for selecting, designing and implementing an application system; the impact of mini- and microcomputers for business management; computer-aided decision making; MIS systems; teleprocessing systems; and future directions for computer use and growth.

Upholds the thesis that there are some things a human does best.

Hardcover, 246 pages, $17.95; also in softcover, $8.95. Prentice-Hall, Inc., Englewood Cliffs, N.J. 07632.

KEYS TO ENHANCING SYSTEM DEVELOPMENT PRODUCTIVITY
By William F. Zachmann

An American Management Association briefing stressing the far-reaching implications of application system productivity throughout the economy. Describes the problem of productivity measurement, tools to improve programmer and analyst productivity, systems to integrate those tools, factors in personnel motivation, strategies for productivity planning and probable future trends.

The author proposes a healthier corporate climate in which information systems receive the intelligent and sympathetic support of executive management.

Softcover, 52 pages. Limited supply of copies available at $5 per copy for AMA members, $7.50 for nonmembers. Amacom, 135 W. 50 St., New York, N.Y. 10020.

THE AUTOMATED OFFICE: AN INTRODUCTION TO THE TECHNOLOGY
By William Saffady

Saffady broadly defines the office environment as the work place of white-collar workers, including managers and administrators, professional and technical personnel, sales persons and clerical workers. He addresses this wide audience in clear, succinct terms designed for both newcomers to office automation and those involved in the field for some time.

Chapter 1 provides an overview of the problems associated with automating the office, including an historical review of automation. Later chapters cover technologies such as word processing, on-line terminals, small business computers, micrographics, reprographics, electronic message systems, facsimile and video.

The final chapter explores integrating and implementing automated office systems, with an eye to the social and behavioral constraints that limit the application of technology.

Hardcover, 241 pages, $29.50 (25% discount for NMA members). National Micrographics Association (NMA), 8719 Colesville Road, Silver Spring, Md. 20910.

Publishers that wish to have their books considered for review can direct press releases, catalogs or other information to Features Editor, Computerworld, *P.O. Box 880, Framingham, Mass. 01701. CW cannot be responsible for unsolicited books.*

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To Avoid Costly Problems

Seminar: Nasa Should Develop Own Expertise

By Tim Scannell
CW Staff

BALTIMORE — By bringing its data processing and computer science activities closer to home, the National Aeronautics and Space Administration (Nasa) could avoid costly problems like the one that scrubbed the first planned launch of the space shuttle earlier this year.

That is the consensus of a group of academicians, scientists and computer industry leaders who are taking part in a 10-week intensive workshop here focusing on the computer science effort of the U.S. space program.

After weeks of scientific haggling and discussion, the group's conclusion is that Nasa's current approach to computer science is as outdated as the rockets used in the early days of the space program. Nasa relies too heavily on the recommendations and data processing suggestions of outside contractors when it should be doing most of the nitty-gritty decision making itself. And because of this dependence, the space agency's overall computer skills and abilities may be 10 to 15 years behind the state of the art, the group believes.

This harsh criticism of Nasa's efforts comes less than two months before the launch of the agency's second space shuttle, scheduled for Sept. 30.

The summer-long "brainstorming" session is sponsored by both the University of Maryland and the Goddard Space Flight Center and included occasional participants from such companies as Control Data Corp., RCA Corp. and IBM. The summer conferences have been held regularly for the past four or five years with attendees coming from various space agencies as well as a number of prestigious universities.

When the workshop wraps up Aug. 14, the group plans to present its findings to Nasa and recommend that it establish a computer science program as a means of formally verifying the expanding role of computers within the space program.

The in-house group would be well-versed and "highly confident" in computer science; it would evaluate such things as computer-based checkout procedures and state-of-the-art hardware and software developments. It would also keep tabs on the small army of outside contractors currently responsible for the majority of Nasa's computer science efforts.

The in-house group "would allow us to see the cases where the contractor is not going in the right direction, or where we cannot count on the contractor," Paul Schneck, assistant director of computer and information science with the Goddard Space Flight Center and co-director of this year's workshop, said.

Heavily Dependent

Unlike previous space shots, the shuttles are heavily dependent on both on-board and ground-based computers for launch, guidance and return to Earth. Because of this growing dependence on computers, the group's primary purpose would be to alert people to possible problem areas and to try to minimize the risk involved in even the most basic space mission, Schneck continued.

The group's recommendations would not be a guarantee of mission success, but would be "the highest level of assurance that can be obtained with today's state of the art." In short, "it would make us smart buyers," Schneck observed.

A classic example of Nasa's need for an in-house computer science effort was illustrated by the problems it had with the first shuttle's on-board computers just hours before the scheduled lift-off earlier this year, according to Cari Helmers, a computer consultant who participated in a two-day "goal-setting" session held just prior to the 10-week workshop.

Because of a timing glitch that occured between the backup and four primary computers of the shuttle *Columbia*, the launch was postponed 48 hours while Nasa officials wrestled with the bootstrapping problem [CW, April 20].

"A lot of what Nasa does is basically a checklist kind of thing like the preflight check of an airplane," Helmers stated. The shuttle's system verification "was a complicated real-time problem right from the start." However, Nasa handled it as "just a simplification . . . a bureaucratic kind of filing away papers."

Helmers, who worked on the first space shuttle's HAL/S compiler software while at Intermetrics, Inc. in Cambridge, Mass., is co-founder and first editor of *Byte* magazine and is currently president of North American Technology, Inc., a consulting group based in Peterborough, N.H.

Previous University of Maryland and Goddard workshops have focused on Nasa's general use of computers, robotics, automatic space stations and even the possibility of extraterrestrial intelligence.

All of the workshops are presented under the aegis of the American Society of Engineering Education.

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Data Network Links U.S. Agencies Worldwide

By Bruce Hoard
CW Staff

WASHINGTON, D.C — The U.S. Department of Agriculture is one of the main beneficiaries of an enhanced worldwide data communications network now being implemented by the U.S. State Department.

State's minicomputer-based network has given birth to specialized intra-agency networks such as the Foreign Agricultural Service's (FAS) Global Economic Data Exchange System (Gedes). Gedes reports have recently been transmitted here from the FAS agricultural counselor at the U.S. Embassy in London, the first point tied to the fledgling network.

Other embassies and consulates in Bonn, West Germany, Paris, Brussels, Belgium, Tokyo, Bangkok, Thailand, Rio de Janeiro, Brazil, and Rome will also be included in the network, which will include FAS attaches in 65 countries by 1985.

London Data

The London data detailed the prospective size of this year's UK grain harvest vs. last year's. That and other "agricultural intelligence" on such subjects as livestock and poultry will be the backbone of the system, which was designed to provide domestic decision makers with the ammunition to deal with daily changes in the world agricultural market.

Richard Cannon, assistant administrator for international agricultural statistics, explained the importance of Gedes. The FAS foreign agricultural counselors and attaches are the "eyes and ears" of the agency, providing critical news on developments abroad, he declared.

"Suddenly foreign information has become part of the domestic policy scene as never before," he said. "This kind of information puts money in people's pockets." In terms of numbers, he said the U.S. exports $40 billion worth of agricultural products yearly.

Enhancements to the system have reduced communications time drastically, in some cases from two weeks to two hours, Cannon said.

That radical change is attributable to the addition of Wang Laboratories, Inc. minicomputers and word processors where before there were outmoded "teletype-to-teletype" communications, according to the State Department's assistant secretary for administration, Julian Adler.

In addition to the minis, FAS also upgraded its service agreement with the international record carriers, upping transmission speeds over the voice-grade lines from 75- to 300 bit/sec to 9,600 bit/sec from most locations, Adler said.

"What the State Department is providing is a means to transmit this information overseas, back to the department's central computers and from the central computers, it can be distributed to the agencies in Washington and elsewhere," he said.

However, with the advent of the Wang VS/80 minis and word processors, dependence on the overseas connection has been lessened.

Time Savings

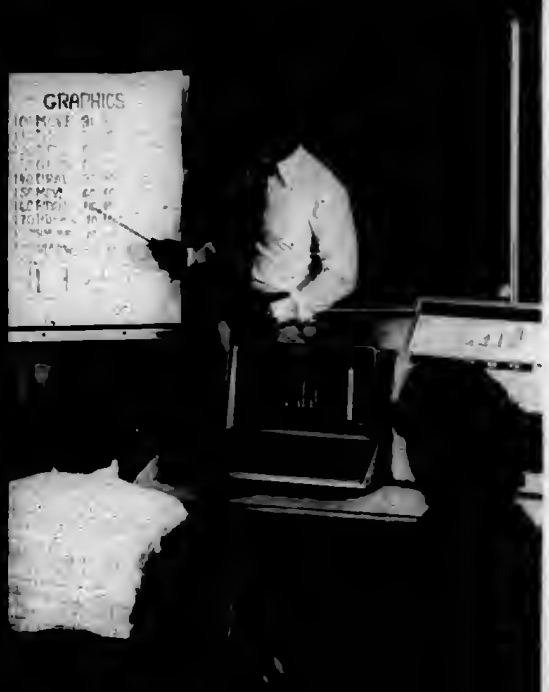
Data that formerly traveled thousands of miles for processing can now be handled on-site, with considerable time savings — time savings that are critical when dealing with the perishable nature of commodity decisions.

The network provides one-way communications in the sense that the data it carries is meant only for U.S. users. Countries of origin will not receive data on what is happening agriculturally in the U.S. and other areas.

If a host country should take umbrage at such a stance, there is no way it could control this kind of transborder data flow because it is protected by diplomatic immunity, emanating as it does from U.S. embassies and consulates.

The U.S. foreign agriculture experts will benefit from return communications from the U.S. For example, they could receive reports from a crop condition assessment division in Houston that employs satellites to evaluate agricultural conditions around the globe.

Desktop computer workshops— from Tektronix



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180	Rockville, MD	Oct. 5-9, 1981
182	Santa Clara, CA	Oct. 12-16, 1981
183	Dallas, TX	Oct. 26-30, 1981
184	Santa Clara, CA	Oct. 26-30, 1981
185	Rockville, MD	Nov. 2-6, 1981
186	Rockville, MD	Nov. 30-Dec. 4, 1981
187	Santa Clara, CA	Nov. 30-Dec. 4, 1981
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Memory Expansion Prominent Feature

Disk, Memory Expansion Bolster AM-100T

By Hillel Segal
Special to CW

Disk and memory expansion capacity are prominent among the Alpha Micro Systems, Inc. AM-100T computer features.

Capable of utilizing up to 2.4G bytes of disk and 1M byte of memory, the AM-100T can be attached to as many as 24 terminals.

These figures are excellent for the price range being considered ($25,000 to $50,000) in the Association of Computer Users (ACU) Series 3 Benchmark Reports. The storage figures reflect recent upward revisions by the manufacturer since the computer was tested by ACU's independent consultant.

All of the programs were written by an experienced Alpha Micro programmer using the Alphabasic language. The benchmark times for the system showed acceptable terminal response time in the fully loaded configuration with eight terminals and background operations. Other times were about average for the group.

The standard package for this price range, designated the AM-1051, consists of an AM-100T processor; 64K bytes of central memory; a 90M-byte disk drive; and the operating system and software. The total price, including an ADM-3A+ terminal and Texas Instruments, Inc. 820 printer to round out the system, is $35,680. With eight terminals, the total cost is $42,330.

The particular configuration benchmark tested was an enhanced version of this package. It had an AM-100T processor, 256K bytes of main memory; a 90M-byte Trident disk drive, two six-port serial I/O boards, a Lear-Siegler, Inc. terminal and a TI printer.

Both of these system configurations differed somewhat from those being used by customers contacted during the user survey. Many of them were using the less powerful AM-100 processor rather than the AM-100T. There was also considerable variety in the terminal and printer types being used.

SCOREBOX

System: Alpha Micro AM-100T
Current Price: $35,680 with one terminal
$42,330 with eight terminals

OTHER BENCHMARK RESULTS
Test E-4

	CPU-Intensive (Run in Background) Time	Order Entry Response Time (8 Terminals Simultaneously) Time
Wang 2200MVP	16.4 Sec	4.6 Sec
IBM Series/1	*	*
TI DS990 Model 4	135.2 Sec**	4.3 Sec**
Hewlett-Packard 250	—	—
DEC Datasystem 355	84.1 Sec	18.1 Sec
Alpha Micro AM-100T	45.2 Sec	5.7 Sec

* Programs could not be run properly due to a loss of characters in the order entry processing.
** For programs run in Cobol; the respective times for Pascal are 66.1 sec and 3.8 sec.
— The 8-terminal test could not be run, as a maximum of 5 terminals can be connected. With 4 terminals, times were 47.8 sec for the CPU test, and 2.3 sec for the order entry test.

This is the 34th in a series of articles giving the highlights of benchmark tests conducted on popular, small computer systems. The full reports were originally published by the Association of Computer Users, a 4,000-member nonprofit organization.

Perhaps because Alpha Micro is not one of the computer giants, its systems were designed to be used with peripheral devices manufactured by other companies. This can be either an advantage or a drawback. While it allows users to put together a customized system, it also involves some risk in creating previously untried combinations.

Although Alpha Micro offers a terminal with its system, any standard RS-232C-compatible CRT terminal will work. Likewise, a variety of printers can be attached to an Alpha Micro system. Most of the users we talked to had acquired Soroc Technology, Inc. or Hazeltine Corp. terminals along with Diablo Systems, Inc., Teletype Corp. or TI printers.

Storage Drives

In the past, Alpha Micro has featured Trident drives with its systems. Although some dealers still offer Trident drives, the AM-1051 package now comes with the Control Data Corp. Phoenix hard disk drive. This drive supplies 90M bytes of on-line storage, 15M bytes of which are a removable cartridge. For larger storage needs, up to 2.4G bytes are available using four 600M-byte CDC storage module device drives or four dual Trident 300M-byte drives.

Alpha Micro currently offers the 1.25M-byte CDC floppy disk drives, although most users we talked with had Persci, Inc. or Wang Laboratories, Inc. floppy drives. Numerous hardware problems were reported with the Persci drive. However, Alpha Micro systems can be used with a number of different disk formats; so the user can select from a variety of drives.

The Alpha Micro Operating System (Amos) is a line-oriented system that is both multitasking and multiprogramming. Multitasking means that the same user can execute several tasks simultaneously while multiprogramming indicates that different users can run different programs at the same time.

Our consultants found Amos to be both powerful and easy to use, although it does not employ a menu-driven approach. They particularly liked the command file feature, which allows a file of Amos commands and functions to be executed when the file name is entered.

One of the highlights of the Alpha Micro software is the powerful text editor, VUE. It runs on a "dumb" terminal such as the ADM-3A+ with which the test system is equipped. One user exclaimed, "VUE? I love it. If it were single, I'd marry it."

Available Languages

Languages available include Alphabasic, Alphapascal and Alphalisp. Fortran and Cobol are offered from outside sources.

Applications software from Alpha Micro is intended for use by dealers in developing end-user packages. The manufacturer offers a full accounting system in this form.

Most of the users interviewed were using Alphabasic as their primary programming language. Alphabasic is an enhanced version of Basic, especially suited for business applications. Among other features, Alphabasic supports floating-point hardware for fast numerical computations, unlimited-length variable names and a memory mapping system. The memory mapping feature allows the user to define entire groups of related information, much like the data definition techniques of Cobol.

Users indicated that the Alpha Micro documentation has improved over the past few years. Our own consultants found the documentation to be quite good. One user said: "The manuals were weak two years ago, but now they're quite complete." Another remarked, "The documentation is good and getting better ... 50 times better than it has been in the past few years."

Alpha Micro's approach to hardware and software service appears to be to let the dealers handle it entirely. This can result in either good or bad service, depending on the dealer involved. One user complained, "Dealing with my dealer has been most unsatisfactory. They are unknowledgeable and lack competency and professionalism." However, not all customers felt that way.

Alpha Micro is apparently adamant in staying out of the customer service field. As one customer said, "The factory is the weak spot. They try to insulate themselves from the public, which they shouldn't do because not all dealers are that knowledgeable."

Hillel Segal is president of the Association of Computer Users, a nonprofit association with members in the U.S., Canada and several other foreign countries. A package of information about the Association of Computer Users is available from the group at P.O. Box 9003, Boulder, Colo. 80301.

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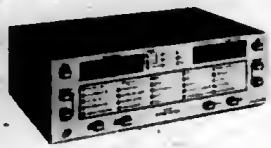

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Users must be able to run programs without concern or even awareness of which processor is running the job. And since the ideal system is an investment in the future, it must be able to readily accommodate expanding workloads and to grow in modular increments with respect to processing power, storage capability or I/O devices.

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TANDEM

A whole generation ahead

Computer Graphics Helps Shape Sculpture for Playboy Hotel/Casino

By Bob Johnson
CW New York Bureau

ATLANTIC CITY, N.J. — What may be the only sculpture in the world created with the help of computer graphics hangs in the Playboy Hotel and Casino here.

"Northern Lights," a five-story spiralling and suspended structure of steel, brass and Plexiglas inspired by the "curtains" of the aurora borealis, was created for Playboy by sculptor Rob Fisher with the assistance of Frederick R. Stocker, a computer graphics specialist at Penn State University.

When Fisher was first commissioned by Playboy to do the sculpture in January 1980, he discussed the possibility of using computer visualization and analysis with a materials research laboratory director at Penn State. The director suggested to Fisher that he contact Stocker, who had more than 10 years of graphics programming design experience and who was also involved in the simulation used by the National Aeronautics and Space Administration's Skylab project.

A graduate of MIT in engineering, Fisher's technical background blended in nicely with the computer-aided sculpturing plans, according to Stocker. "An experiment with an artist with a technical background evolved into an environment that could be analyzed and put on paper," he said.

Stocker previously produced many art/science studies utilizing an Adage Model 30 graphics system, Fisher noted. He said that three dimensional and multidimensional structures that Stocker produced were highly aesthetic in nature. "His approach to programming was like a sculptor shaping his material," Fisher said.

No Real Expectations

The artist/programmer team had no real expectations of what beneficial results the computer could offer in sculpting, aside from the different views of the work, but they revealed that the process yielded much information, the final sculpture being only one part.

Although technical control was desired, a "comfortable interface" between the artist and graphics computer was essential, Fisher noted. "Computer design has long been criticized for imposing limits, for producing sterile, automatic, lifeless forms. We set out to demonstrate that the computer can be a pliant tool in the service of man's creative designs and this was the only acceptable modus operendi. Man is in the ascendancy, the computer is an electronic analytic drafting tool," he said.

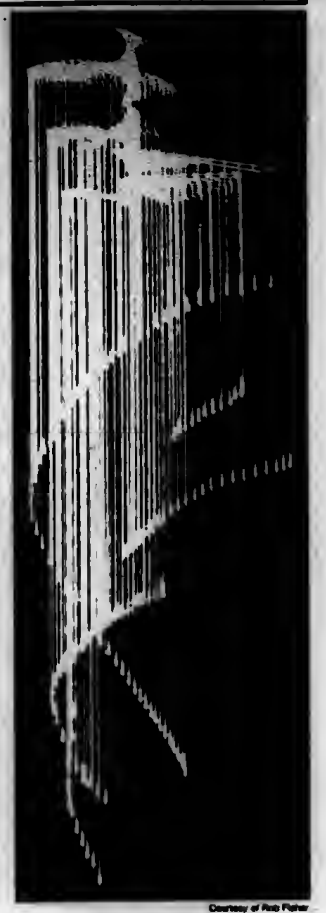
Stocker explained that he had to develop a series of programming packages for the page computer that would help Fisher analyze all of the variables in creating the sculpture. Because of the design complexity, space requirements and 5,000 individual components needed for the project, a conventional scale model was not acceptable, Fisher noted. A computer model, however, was what was needed.

Using the computer, Fisher fed in conceptual design information as to what the sculpture would look like, engineering specifications for weightings and hangings, and the dimensions of the Playboy Grande Staircase connecting three casino levels with the lobby.

Original measurements of the sculpture's components from first-hand drawings, including 144 stainless steel tubes supported by a 4½-in., 17-ft long tube, were accumulated to produce a visually graphic diagram. In the case of tube length and deflection, the computer made a comparison of tube length loading with deflection and gave a realistic model of the sculpture core under load.

A pseudo real-time visual display of the work, permitted by a hybrid array processor rotating images of it to permit adjustments to structure and to views of it from many angles, was available to Fisher.

In addition to the visual images on screen, Stocker produced photographic slides from the raster screen display using a computer-driven exposure and color filtering system. These slides were later used to communicate specific ideas in the actual building of the artwork.



Courtesy of Rob Fisher

Northern Lights

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Automation to Disrupt Office: Consultant

By Ann Dooley
CW Staff

CINCINNATI — Changes resulting from automating the office will create major disruptions and cause frequent resistance in low-level managers and office workers alike, a conference audience was told here recently.

Office patterns that have been established in individual work habits and long-time behavior among co-workers will collide with the dramatic changes that are bound to occur as automation increases in the office, Wilbert Galitz, consultant for CNA Insurance Co., stated.

The working environment and how work is accomplished is going to evolve, according to Galitz, speaking at the National Institute for Occupational Safety and Health (Niosh) conference on occupational health issues affecting clerical and secretarial personnel.

In the past, systems have failed because people failed to address the issue of change, Galitz stated. That must be avoided if office automation is going to occur with any kind of success. To reduce resistance to change, managers must first institute planning procedures, he advised the audience.

Right Time?

Managers must determine when the time is right to implement changes and what will be changed. Top management support is essential to any smooth and lasting implementation and flexibility is important in order to change the original plan to meet users' changing needs.

In addition, change should occur at a slow pace, in small steps and, initially, with limited technological advance, Galitz said. In order to sell the benefits of the changes to users and to management, it is important to focus first on changes with an immediate high potential for success and on those with high usage potential so that tangible results can be shown.

Galitz also told the audience that design is essential to the success of restructuring the office environment. Systems should be simple to use and be within the user's capabilities. An acceptable job design, a hospitable working environment and thorough documentation must all be a part of the overall design process.

Good installation procedures are a third factor in successful office automation. Managers must communicate the goals and objectives of the new automated techniques. The benefits to employees and to the company should be outlined, and people's roles should be defined and presented to each individual employee, he advised. Employees should be given a road map and a timetable so they will have concrete expectations about the project.

Timing is important and formal avenues of appeal should be instituted so employees will feel comfortable about the entire process.

Addressing the issues involving the human factor in office automation, O.B. Diskerson, M.D. and director of health and safety at IBM, told the audience comprised of managers, labor and academics that the responsibility for occupational health lies with three different parties. The manufacturer of the equipment, the employer and the operator all influence the design and implementation of automated equipment.

James Driscoll, assistant professor in the industrial relations section of the Sloan School of Management at MIT, asserted that companies may be willing to make positive ergonomic changes for professional and managerial users, but are not as inclined to do so for the secretarial and clerical work force. These people must fit the office rather than the other way around, he added.

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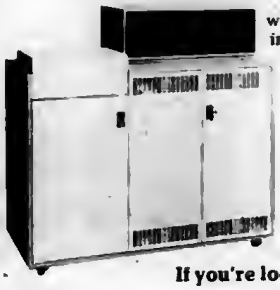

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Other Board Changes Announced

Wolfson Heading NCC Board

ARLINGTON, Va. — Dr. Seymour J. Wolfson, associate professor of computer science at Wayne State University in Detroit, has been elected chairman of the National Computer Conference (NCC) board.

The board determines policy for the annual conference, which is the largest domestic conference devoted to the scientific and educational aspects of information processing. Wolfson previously served on the board as the Association for Computing Machinery representative, which he will continue to do besides serving as chairman.

Dr. Sylvia Charp, who is being replaced by Wolfson, will remain on the NCC board as an American Federation of Information Processing (Afips) representative. Other changes on the board include the appointments of Walter A. Johnson as treasurer and Afips representative and Dr. Stanley Winkler as the representative for the Institute of Electrical and Electronics Engineers.

Black DP Meet Set for Sept. 11

PHILADELPHIA — The annual national meeting of the Black Data Processing Associates (BDPA) will be held here Sept. 11-13.

The theme of this year's meeting is "Growth Through Association." The keynote speaker will be Samuel Gravely, director of the National Programs Division of CTEC, Inc.

The meeting will also feature workshops and an equipment display.

More information about the national meeting is available from BDPA at P.O. Box 7466, Philadelphia, Pa. 19101.

Calendar

Sept. 14-18, Clearwater Beach, Fla. — **Modern Data Communications.** Contact: Director, Continuing Engineering Education, George Washington University, Washington, D.C. 20052.

Sept. 14-18, Denver, Colo. — **Design Techniques Workshop.** Contact: BSI, 4720 Montgomery Lane, Bethesda, Md. 20814.

Sept. 14-18, Kansas City, Mo. — **Systems Analysis Workshop.** Contact: BSI, 4720 Montgomery Lane, Bethesda, Md. Also being held Sept. 14-18 in Pittsburgh, Pa., Sept. 21-25 in Short Hills, N.J., Sept. 28-Oct. 2 in Denver, Colo. and Sept. 28-Oct. 2 in Short Hills, N.J.

Sept. 14-18, New York — **Structured Design Workshop.** Contact: Anthony Formica, Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

Sept. 14-18, New York — **Auditing Structured Analysis & Design Workshop.** Contact: Anthony Formica, 1133 Ave. of the Americas, New York, N.Y. 10036.

Sept. 15-16, New York — **Workstations: The Convergence of Information Processing and Telecommunications.** Contact: Rita Tannenbaum, Probe Research, Inc., P.O. Box 251, Millburn, N.J. 07041.

Sept 15-16, Short Hills, N.J. — **Introduction to Data Processing.** Contact: Advanced Training Center of Chubb Institute, 480 Morris Ave., Summit, N.J. 07901.

Sept. 15-16, Atlanta — **How to Select Computer Terminals and Increase Job Productivity.** Contact: CRC Systems, Inc., Professional Development Division, 4020 Williamsburg Court, Fairfax, Va. 22032. Also being held Sept. 29-30 in Washington, D.C.

Sept. 15-17, San Francisco — **Wescon/81 Show and Convention.** Contact: Robert Myers, Electronic Conventions, Inc., 999 N. Sepulveda Blvd., El Segundo, Calif. 90245.

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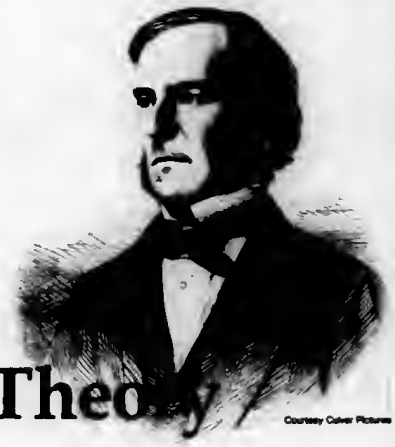
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Part 4 . . . George Boole: Progenitor Of Information Theory

By Marguerite Zientara
CW Writer/Analyst

"Pure Mathematics was discovered by Boole in a work which he called The Laws of Thought."

— Bertrand Russell

All the geartrains, stepped wheels, vacuum tubes or printed circuit boards in the world do not a computer make. Besides the immensely important mechanical developments of Pascal, Leibniz and Babbage, it took an entirely original theory of logic to ultimately breathe life into the machines that "think."

Expanding on Leibniz's "general method in which all truths of the reason would be reduced to a kind of calculation" — set forth 188 years earlier — English mathematician George Boole in 1854 laid the groundwork for what we know today as Information Theory (see story below), through the publication of his masterpiece, *An Investigation of the Laws of Thought, on which are founded the Mathematical Theories of Logic and Probabilities.*

In this work, published when the author was 39, Boole reduced logic to an extremely simple type of algebra, in which "reasoning" is carried out through manipulating formulas simpler than those used in second-year traditional algebra.

His theory of logic, which recognizes three basic operations — AND, OR and NOT — was to become germane to the development of telephone circuit switching and the design of electronic computers. As with Leibniz's ideas, however, Boolean algebra was neglected for many years after it was proposed.

Nevertheless, few mathematical works of the past century have had as great an ultimate impact on mathematics and philosophy than Boole's book. The significance of the work, recognized by Boole's contemporary, the logician Augustus De Morgan, was expressed by that mathematician:

"That the symbolic processes of algebra, invented as tools of numerical calculation, should be competent to express every act of thought, and to furnish the grammar and dictionary of an all-containing system of logic, would not have been believed until it was proved in *Laws of Thought*."

George Boole was born on Nov. 2, 1815, in Lincoln, England, the son of a poor shoemaker. Although a contemporary of Charles Babbage, Boole was not born into the same privileged class as Babbage, but rather was a member of the "lower classes," a circumstance that made his early life extremely difficult.

Sprung from a stratum of society in which children were not expected to, and in fact were discouraged from, attending the university, George had to educate himself entirely on his own.

Even though the Industrial Revolution was well under way in England, a knowledge of the ancient languages was still considered to be the mark of a gentleman. Naturally, no Latin or Greek was taught at the school Boole was allowed to attend.

Believing such knowledge was necessary if he ever wanted to rise above his humble beginnings, Boole taught himself Greek and Latin, with his fa-

(Continued on Next Page)

C.E. Shannon Put It All Together

C.E. Shannon

It was in 1937 that MIT graduate student Claude Elwood Shannon put two and two together and showed that Boolean algebra could be applied to problems of switching circuits.

As his master's thesis in electrical engineering, Shannon published a paper entitled, "A Symbolic Analysis of Relay and Switching Circuits," applying Boole's symbolic logic to the analysis of switching circuitry and showing how logical algebra could be performed by relays.

In demonstrating the parallel between switching circuits and the algebra of logic, Shannon held that true or false values were analogous with open and closed states of electrical circuits.

Shannon had defined a universal measure and a universal unit of information — the binary digit, or bit. "A bit is the choice between plus or minus; it is the amount of information needed to remove the uncertainty between yes and no."

Some credit the thesis with having laid the foundation for the use of the binary number system in place of the decimal system in the computer. Shannon himself is a bit too modest to make such a claim. Nevertheless, it is generally agreed that his profoundly original analysis proved to be a milestone in the development of digital computers and helped bring the world full-speed into the Information Age.

Since switching circuits are at the heart of automatic telephone central exchanges, Shannon's ideas first proved perfectly useful for Bell Telephone Laboratories. Shannon went to work for Bell as a mathematician

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(Continued from Previous Page)
ther's unschooled encouragement, and at the age of 12 managed to translate an ode of Horace into English verse.

Understanding nothing of the technical merits of the translation, but understandably proud, Boole's father had it printed in the local paper. A scholarly debate ensued, which proved both flattering and humiliating to Boole.

While one classical master contended that a boy of 12 could not have produced such a translation, on the other hand, some grave technical defects were criticized. Determined to perfect his knowledge of Latin as well as Greek, Boole spent the next two years slavishly studying the two languages, again without help.

Although these studies were not enough to transform him into a true gentleman, such drudgery reinforced his already strong self-discipline and contributed to the classical style of Boole's mature prose.

Considering the fact that his father quit school after the third grade, it is amazing to learn that Boole got his early mathematical training from his father, who had somehow managed to educate himself in at least that area.

By the age of 16, it became necessary for Boole to go to work to help out his parents. Taking a job as an "usher," or assistant teacher, in an elementary school, Boole was to spend four years teaching in two different schools.

Always with an eye toward improving his station in life, Boole began to consider the few options open to him. Since teaching, at the level he was practicing it, was not considered a profession or even a reputable trade, Boole looked to the church for his social salvation. He would become a clergyman.

When he was not teaching, Boole spent his time in serious study of French, German and Italian in preparation for his ecclesiastical life. Unfortunately, his family's poverty once more disrupted Boole's plans; his parents urged him to forego the religious life in view of their ever-deteriorating financial situation.

Opens School

Responsive as always to his parents' needs, Boole decided to open a school of his own. His age: 20. While acting as a teacher, Boole always considered himself a student, as well, and proceeded to teach himself the entire body of higher mathematics as it then existed.

It is probable that he tackled the *Mecanique celeste* of Pierre-Simon de Laplace, described by the historian E.T. Bell as "one of the toughest masterpieces ever written for a conscientious student to assimilate, for the mathematical reasoning in it is full of gaps and enigmatical declarations that 'it is easy to see.'"

He also would have been likely to study the "excessively abstract *Mecanique analytique* of [Comte Joseph Louis] Lagrange, in which there is not a single diagram to illuminate the analysis from beginning to end," according to Bell.

Yet Boole, whose mind apparently was designed to easily understand and absorb just such abstractions, was successful enough to produce his first written contribution to mathematics based on these extremely difficult studies — a paper on the calculus of variations.

Early in his mathematical career, Boole made a discovery that could have been made by any of his established and more experienced contemporaries and without which it is said the theory of relativity would have been impossible. He discovered invariants.

The fact that Boole saw what others overlooked and, even more important, recognized its significance, foreshadowed his future mathematical breakthroughs, which would not be truly appreciated until proven practical nearly a century later.

Once Boole's mathematical career got off the ground with the publication of his first paper, the question was: How to make his ideas known at a time when opportunities for mathematical publication were limited? Boole did not belong to any of the learned societies that maintained their own journals, although he gradually developed friendships with many of the leading British

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mathematicians, either personally or through correspondence.

One such friendship was with the Scottish mathematician D.F. Gregory, who founded *The Cambridge Mathematical Journal* in 1837. Boole submitted some of his work, the originality and style of which greatly impressed Gregory. Not only had Boole found a vehicle for publishing his work, he had found a lifelong friend.

Part of Credit

Part of the credit for Boole's later development of his theory of logic must be given to the intellectual climate in England at the time — exemplified by the British mathematical "reformers," including Babbage, Gregory, George Peacock, John Herschel and De Morgan, who together created the basis for the modern conception of algebra.

It was Peacock who, in his 1830 work, *Treatise on Algebra*, broke away from the idea that the "x,y,z" in such relations as "$x+y=y+x$," "$xy=yx$" and "$x(y+z)=xy+xz$" necessarily represent numbers. They do not. Rather, they are arbitrary marks, combined according to certain operations and symbolized by "signs" in accordance with established postulates.

This renovation of algebra afforded Boole the chance to do work that was appreciated by his contemporaries, although — without practical application in his own century — symbolic logic was to lie fallow for many decades. As late as 1910, for example, eminent mathematicians scorned it as a "philosophical" curiosity without mathematical significance.

It was the occasion of an ongoing intellectual "debate" between the Scottish philosopher Sir William Hamilton and De Morgan on the merits of mathematics — or lack thereof, according to Hamilton — that caused Boole to publish the seminal *Mathematical Analysis of Logic* in 1848. The slim volume, meant as a defense of De Morgan, was the prelude to Boole's masterpiece, published six years later.

With the publication of the *Analysis*, the vision and brilliant insight of this quiet, simple man became apparent to his mathematical friends, who encouraged him to enter Cambridge for some orthodox mathematical training.

Boole reluctantly turned down those suggestions because his parents had become entirely dependent upon him for support. Continuing his teaching chores without complaint, Boole finally got a break in the following year, 1849, when he was appointed Professor of Mathematics at the newly opened Queen's College in what was then called Cork, Ireland.

The appointment allowed him to devote more time to his *Laws of Thought*, which he continually honed and perfected for five more years, until its publication in 1854.

As Boole wrote in the first paragraph of the book: "The design of the following treatise is to investigate the fundamental laws of those operations of the mind by which reasoning is performed; to give expression to them in the symbolical language of a Calculus, and upon this foundation to establish the science of Logic and construct its method; to make that method itself the basis of a general method for the application of the mathematical doctrine of Probabilities; and, finally, to collect from the various elements of truth brought to view in the course of these inquiries some probable intimations concerning the nature and constitution of the human mind."

And later in the chapter: "Now the actual investigations of the following pages exhibit Logic, in its practical aspect, as a system of processes carried on by the aid of symbols having a definite interpretation, and subject to laws founded upon that interpretation alone. But at the same time they exhibit those laws as identical in form with the laws of the general symbols of algebra, with this single addition, viz., that the symbols of Logic are further subject to a special law . . . to which the symbols of quantity, as such, are not subject."

In other words, while it is not true in common algebra, for example, that every "x" is equal to its squsre, it is true in the Boolean algebra of logic. According to Boole, $x^2=x$ for every

(Continued on Page 32)

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"x" in his system. In numerical terms, of course, this equation has "0" and "1" as its only solutions. Therein lies the importance of the binary system for modern computers — their logical parts are in effect carrying out binary operations.

Besides logic, Boolean algebra has at least two other important applications. The first of these stems from the fact that it is the natural algebra with which to treat the combination of sets of elements under the operations of intersection and union of sets. Considering also the idea of "number of elements" in a set, Boolean algebra becomes the foundation for the theory of probability.

In spite of its subsequent importance — to many other branches of mathematics as well as the development of the computer — Boole's monumental work was to remain only a curiosity for many years. Like Babbage, Boole was a man ahead of his time. It was not until Alfred North Whitehead and Bertrand Russell published their 3-volume *Principia Mathematica* (1910-1913) that serious mathematicians began to study formal logic.

It is noteworthy that, while Boole's accomplishments depended partly on the mathematical originality already in evidence in England, including the ideas of Babbage, Babbage is said to have drawn from Boole's work, as well.

Mathematicians point out that Babbage's understanding of the notion of a mathematical operation and the quantities upon which it operated was made possible by the group of British algebraists to which Boole belonged.

Because Boole demonstrated that logic can be reduced to extremely simple algebraic systems, it was possible for Babbage and his successors to design mechanical devices that could perform the necessary logical tasks.

Mary Everest Boole

The year after he published his *Laws of Thought*, Boole married Mary Everest, niece of the professor of Greek at Queen's College. The marriage would last only the nine years remaining before Boole's untimely death at the age of 49.

Honored and with a growing fame, Boole died on Dec. 8, 1864, of pneumonia reportedly contracted after he kept a lecture engagement, even though he was soaked to the skin.

Mary Boole, who had become a devoted disciple of her husband, published a pamphlet after his death in which she stated some of his ideas — no doubt stemming from his many years as a teacher — on the need to rationalize and humanize the education of young children.

In *Boole's Psychology*, Mary Boole recounted a significant event in the life of George Boole: He told his wife that when he was about 17, it "flashed upon" him as he walked across a field that besides the knowledge gained from direct observation, man derives knowledge from some undefinable and invisible source, which Mary Boole called "the unconscious."

Further evidence of his belief in the unconscious lies in the closing pages of *The Laws of Thought*, in which Boole cites "the error of those who regard the study of Mathematics, and of their applications, as a sufficient basis either of knowledge or of discipline."

Boole was, if anything, logical and disciplined. Nevertheless, he demonstrated his all-important broad vision of the world in his statements, which he felt "to some ... will appear foreign to the professed design of this work."

Nevertheless, Boole wrote: "If the mind, in its capacity of formal reasoning, obeys, whether consciously or unconsciously, mathematical laws, it claims through its other capacities of sentiment and action, through its perceptions of beauty and of moral fitness, through its deep springs of emotion and affection, to hold relation to a different order of things. ... As truly ... as the cultivation of the mathematical or deductive faculty is a part of intellectual discipline, so truly is it only a part."

It was the powerful combination of intellect and intuition in George Boole that resulted in the several

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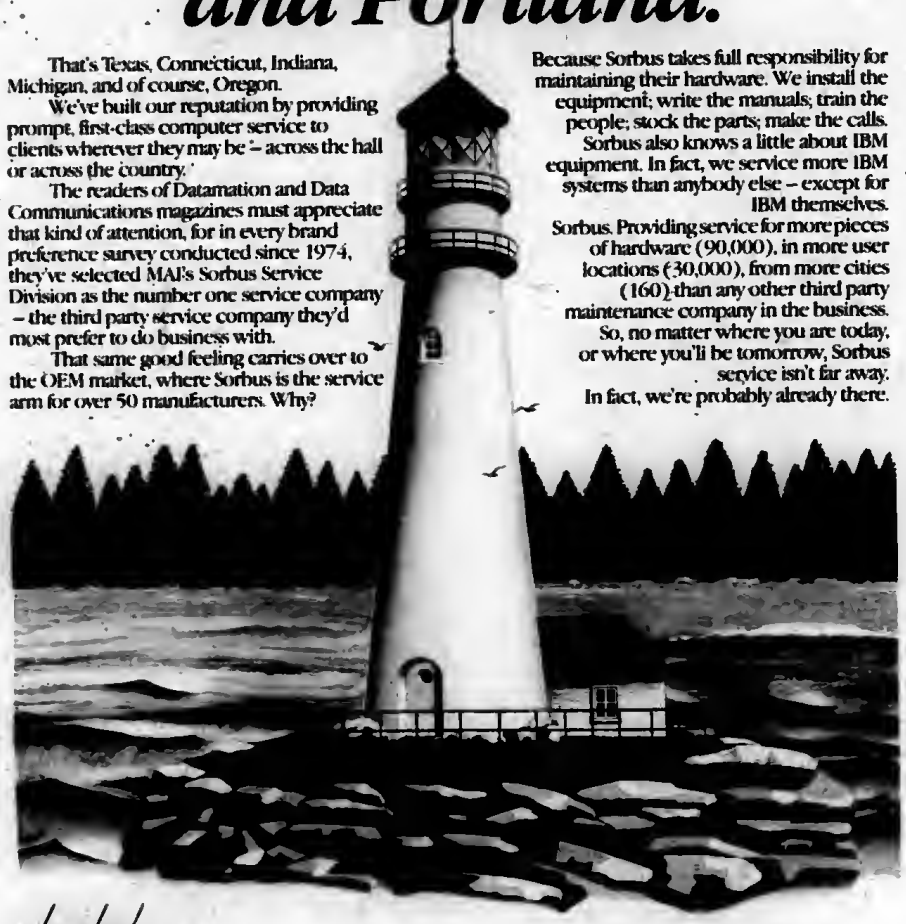

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mathematical milestones he contributed, the effects of which will undoubtedly be felt for ages to come.

Shannon Tied It All Together

(Continued from Page 29)

in 1941 and moved "from triumph to triumph" there, in the words of his former MIT professor Norbert Wiener, developer of the concept of "cybernetics."

One of Shannon's triumphs at Bell was the publication in 1948 of his "Mathematical Theory of Communications," in which he showed systems engineers how to eliminate noise by encoding signals. That theory spawned a major effort toward achieving reliable communications with low error rates.

Shannon's interests eventually extended to the development of the mechanical mouse, the automatic chess player, mathematical cryptography and the entire scope of modern information theory.

In a 1973 magazine interview, Shannon was asked what he felt information theory's future was at the time of his original publication. "I was quite surprised at the publicity and reaction," he recalled. Last month, now looking back more than 40 years, Shannon recalled that the immediate acceptance and publicization of his ideas "was the highlight of my life at that time."

How did he reach his brilliant conclusions? "I had studied Boolean algebra as a course in philosophy," Shannon recalled. Then, as an MIT graduate student, Shannon worked on Vannevar Bush's analog computer, the "differential analyzer."

"And part of that machine was a very complex relay circuit," he explained. "I had to kind of fix that from time to time to keep it going and in so doing I got interested in the logic of relay circuits. And relay circuits are really the same thing as computing circuits.

"In working with these and thinking about that, it became obvious that the natural mathematics to use for relays or switching circuits was that of Boole."

Shannon's "obvious" solution got him the 1939 Noble Prize from the American Institute of Electrical Engineers, when he was 23.

Now 65, Shannon is retired and relatively inactive in the field, although he remains a member of the board of directors of Teledyne Corp. He lives with his mathematician wife, Betty Moore Shannon, and their three children in Winchester, Mass. Shannon now devotes most of his time to jogging, juggling, occasional unicycle-riding (several models of which he has designed and built), listening to jazz and investing in stocks.

And what of the future of information theory? Many have tried to apply its concepts to areas far outside the domain of electronic communications — psychology, art, theology and semantics — but without much success. The real future of the discipline lies in artificial intelligence, Shannon feels.

"Computers, as people think of them today, are one thing," Shannon said, "but I visualize the possibility of complicated robot-type devices to carry out very sophisticated intellectual jobs."

While computers already can do such "shop work" as household bookkeeping, banking and census functions, Shannon predicts an evolution to such responsibilities as letter-writing and "servant"-like functions in the decades ahead.

A perfect example of the sophisticated intellectual contributions possible is the recently solved "four-color theorem," a problem that puzzled mathematicians for a century, according to Shannon. Computers have now figured out how to color a map with four colors so that no contiguous countries have the same hue.

Naturally, "the computer had a lot of help from the programmers," but the computer "did the dirty work, the hard work of trying out many different cases," Shannon observed.

"So in a way the computer will work hand-in-hand with people and will do the things that require a lot of time and detail. The symbiosis of these two will be, I think, a terrific thing."

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EDITORIAL

ATC Strike Exposes Industry's Achilles' Heel

If the computer community has an Achilles' heel, it is the people behind the machines. That type of statement may initially offend, but it is not meant as a condemnation of the legions who program, operate and use computers in this country and around the world. Quite the contrary.

Just as the mythological warrior Achilles was felled when wounded in his only vulnerable spot, his heel (by which his mother had dipped him into the protective waters of the River Styx), so is a computer-dependent industry mortally wounded when it loses the people behind its machines.

The air traffic controllers (ATC) strike is a perfect example of such a crippling blow to an industry that depends very heavily on computers. Naturally, people are not the only vulnerable spot computer users must protect, but the recent loss of key operators has reemphasized modern society's utter dependence on "computer-intelligent" workers.

Although the Federal Aviation Administration has endured many criticisms of its third-generation ATC computer equipment, it has been shown that when that equipment fails, controllers can still move all the traffic — a little more slowly, perhaps, but still at peak loads.

It is only when the human mechanism fails that the system threatens to break down completely. And it is a rare citizen — even in the most remote spot — who was not in some way affected by the recent breakdown. Whether it was his mail or his mother-in-law that arrived late, he felt the pinch as keenly as an air traveler stranded for hours in a distant airport.

Today it is certain that the Achilles' heel of the computer community has become an Achilles' heel of society at large.

DATA PAST

Five Years Ago
August 9, 1976

SOUTHBORO, Mass. — Data General Corp. upwardly expanded its Nova 3 family with the introduction of the 3/D, a minicomputer that it said featured a 32K-word MOS memory board and the ability to run dual operations.

Also introduced was the Dasher family of 30- and 60 char./sec terminal printers.

— — —

WASHINGTON, D.C. — The Federal Communications Commission (FCC) initiated a second Computer Inqoiry to update its original 1971 decision and apply current definitions to the boundary between data communications and data processing. In approving a second inquiry, the commission said distributed networks in which CPUs and terminals were performing both data processing and "communications control applications" were one of the developments "tending to cause a blurring" between the two major areas.

Ten Years Ago
August 11, 1971

CHICAGO — The elders of the DP community were feted on the occasion of the computer's 25th birthday. ACM '71 attendees confirmed that acceptance and usage of computers was growing astronomically, more than the wildest dreams of the DP innovators of the recent and distant past, and the same holds true for the technology itself.

Members of the Association for Computing Machinery (ACM) want their organization to spend less time on technology and more on improving both the quality of information handling within the industry and on the improvement of the image of the industry and of the computer outside the DP community.

— — —

MINNEAPOLIS, Minn. — The 921 optical character reader from Control Data Corp. used a helium-neon laser to drive a system that reads 1,200 document/min and costs $1,865/mo on a one-year lease.

LETTERS

Non-IBM Muscles

The article "Consultant: IBM Using Modem Muscle" [CW, July 20] would lead one to believe that IBM is their only answer for the capabilities listed and discussed.

Systems comparable to those IBM introduced last year and is planning for the future have been around for the last four to five years from such companies as Paradyne Corp., Milgo Corp., Codex Corp. and Intertel, Inc.

IBM's entrance into this field offers nothing new in the way of capabilities or services. It simply allows IBM to follow their plan of selling bigger CPUs, more memory and more software by bundling the modem capabilities into their CPU.

Thomas J. Malkus
Sales Manager
Data Processing Sciences Corp.
Cleveland, Ohio

Cobol-81 Conversion

The Reader Commentary by Robert Grauer [CW, July 20] is typical of the lack of understanding of the future cost of conversion that is so prevalent in our industry. I am completing the writing of *A Conversion Cost Estimation Guideline* for the National Bureau of Standards' special publication series. To write the guideline, my staff and I studied the history of all the conversions we could find. We interviewed various people in the government who have also gathered cost history on conversions and analyzed the results.

The one strong conclusion to be drawn from all of our investigations is that translation is only a small part of the total conversion cost.

Of all the conversions that have occurred in the past few years, the one that has done the best job of saving and analyzing cost data is the Navy Data Processing Service Center (DPSC) project. It entailed the replacement of hardware at six locations, converting several thousand programs and several million lines of code. It had very good conversion aids and a very effective tranalator — at least as good as CSA, mentioned by Grauer.

In that conversion, an approximate breakdown of the cost was as follows: planning — 20%; test data acquisition and validation — 15%; translation, unit and aystem testing — 30%; production testing — 35%.

This shows that 70% of the cost is not concerned with the one aspect of conversion that Grauer has devoted his attention to — automated translation.

Conversion is an expensive process. The amounts of $20 million for the Traveler's Insurance Companies and $500 million for the federal government are probably accurate reflections of the true cost of conversion.

A.J. Domenico
Program Development
Electronic Data Systems Corp.
Bethesda, Md.

And Agreement

I enjoyed Robert Grauer's article, "Program Copes With Cobol-81 Conversion," [CW, July 20], and I agree wholeheartedly with him.

One note, though: Figure 2 should read:

```
AFTER CSA:
  NESTED-IF-FOLLOWS.
    IF ITEM-VALID
      IF CODES-ARE-VALID
        MOVE WS-NUMBER ETC . . .
      ELSE
        DISPLAY ETC . . .
      END-IF
    ELSE
      DISPLAY ETC . . .
    END-IF.
```

Each IF clause must have a corresponding END-IF statement.

Robert Knopf
Programmer
Brooklyn Union Gas Co.
Brooklyn, N.Y.

SOFTLINE/Werner L. Frank

Micros and Software Architecture

The fundamental direction of software architecture has been guided by the following cardinal needs:

1. To exploit the most valuable resource in a hardware environment.

2. To account for the requirement to share data in performing certain applications.

In recent years, these goals have been joined by the desire to provide a satisfactory user interface via terminal devices.

For a long period of time, the first requirement was influenced by CPU and memory sharing and the second by storage sharing. The third was ignored or, at best, given second-class treatment.

In today's world of low-cost microprocessor-based systems, a sudden shift of favorable economics has placed man's value at a premium over the machine's cost. Hence, there is an inflection point in computer utilization economics that permeates the software issues. The question is, how does software architecture change in a multiuser, distributed and interactive computing environment?

Deja vu! With the microprocessor, we are once more back to the situation of the one-user, one-application, one-computer environment which permeated the esrly days of data processing. In those days, however, many users had access to the machine sequentially. The low-cost personal computer of today is, on the other hand, a dedicated appliance that does not involve resource sharing and that can pay for itself, even if it is used only sporadically.

Temptation to Share

But as the contest proceeds between microcomputers and small minicomputers on one hand and the eight-bit chip vs. its 16- and 32-bit cousins on the other hand, the temptation to share "most valuable resources" reemerges.

How does one build multiuser systems? Does one use cheap, dumb terminals and powerful, shared CPU and storage devices (shared cluster systems) or intelligent, free-standing terminals that have occasional access to commonly used data as the need arises (distributed intelligence systems)?

Since we are still in a transitional phase, the snswer may not yet be overwhelmingly clear. But some very strong arguments and benefits support one scheme over the other.

We evaluate the situation from the point of view of system operability, cost economics and software demsnds.

The shared cluster approach, be it mainframe- or minicomputer-based, ultimately has operating limitations, either in CPU performance or in the ability to share data among many users. Forcing such a system into s time-sharing mode may achieve dats sharing, but at the expense of system performance. Most important, however, the system becomes critically vulnerable, given its monolithic composition with respect to certain crucial elements, especially the CPU itself. Also, contention for peripherals, such as printers, can easily develop. Needless to say, there is also the convenience factor; complete end-user control is lacking in s distributed processing sense. On the other hand, full distribotion of computing power to a microcomputer, with stendant peripherals, provides optimal performance, unimpeded access and ready and convenient availability of printer ootput.

Many arguments supporting clustered systems point to a seemingly higher cost for free-standing intelligent terminals (distributed logic) than for the multiterminal, sbared centralized configurations. Such views, however, are, or will soon become, dated. With the very low cost of high-volome-manufactured chips and boards, the question of "sharing" the electronics becomes rather moot. What sense does it make, for example, for users to share a $100 16-bit CPU chip which will probably decline in price to $10 in the next two years?

Computing system costs are rapidly moving in the direction of the material elements themselves such as the plastic cover, the tube and the keyboard — not the electronic components.

Hence, the degree of terminal intelligence should not be the significant factor in deciding on an appropriate overall hardware topology or architecture. In fact, the completely decentralized and distributed microbased systems of today can readily compete in price with mini-based clustered configurations. If one adds the additional elements of reliability, individual control and ease of use, then the comparison overwhelmingly favors the dedicated, intelligent desktop computer.

This approach does not, of course, satisfy the requirement to share data in a multiuser application environment. This can, however, be handled through the local networking capability of these intelligent terminals — either with a serial loop lashup or comparable Ethernet-like communications facility. Thus data sharing is achieved via mutual access to fixed-disk storage devices — which, indeed, become the "most valuable resoorce," both in terms of hardware cost and in terms of system component vulnerability.

Heart of the Matter

Which leads us to the heart of the issue and our interest, the software.

We are convinced that most serious application software will move quickly to a bifurcated mode of operation reflecting the duality of computing possible in a workstation/larger computer environment. One portion of this software will be executed by a microprocessor-based workstation, with the balance of processing done by a larger computer, be it a standard mainframe or minicomputer. Data entry, interactive dialogue, query and some selected computing will be performed at the workstation in substantially stand-alone fashion.

Intermittent transmission of requests and data will take place between the workstation and the centralized computer. Certain main processing activities will necessarily be supported on this latter computer, as well as storage and maintenance of large common data banks. We observe this to be a loosely coupled distributed network of workstations and larger computers.

Software for such modern hardware systems must, therefore, be viewed in the context of operating stand-alone in the microcomputer and as an adjunct to software that operates centrally. In the first case, software is structured for the detached, local mode, whereas for the latter, the software must interface with, and be a component of, a foreign system. Both views have a major impact on future software design for such networked systems.

First there is a common and simple environment for software at the workstation. Software designed for a single desktop computer needs few, if any, security measures and essentislly no operating priority scheme. Physical and priority control are at the on/off switch and data control exists by virtue of a portable diskette or a password for transmission. The operating system will be single-channel, or at most it may have some spooling facility. There is no teleprocessing

(Continued on Page 40)

HUMAN CONNECTION/Jack Stone

Communication Begins at Home

Many of my recent articles have dealt with communications — in the broadest sense — between DPers and our users. Now Stephen Epner writes about an experience he had with a problem of communications between two DP experts and shares the knowledge he gsined from it.

"As president of the Independent Computer Consultants Association (ICCA), I was asked to help mediate what had become a difficult situation thst developed between two consultants.

"A small business office manager was looking for ways to aotomate procedures within his office. He had been contacted by a number of vendors and systems houses with potential solutions to his problems. The many alternatives available were overwhelming him. His knowledge of data processing was insufficient for him to feel comfortable in making key technical decisions. He therefore called in an independent consultant (I will call him the "advisory consultant") to assist in the decision-making process.

"The best solution appeared to be one provided by another consultant (I will identify him as the "systems consultant") who customized general-purpose software to respond to special client needs. The advisory consultant, to protect his client's interests, requested that the systems consultant detail his specifications, make certain changes in his contracts and modify a proposed payment schedule. This systems consultant did so.

"Unfortunately, there developed some misunderstandings about the new documentation and these led to further misunderstandings. Soon the two consultants were at odds, which was bad enough, but the disagreements also jeopardized the client's implementation schedule.

Lack of Understanding

"The basic problem? Neither consultant understood the other's definition of a rather fundamental concept in information systems: system specifications. In fact, their views of the meaning of specifications were extremely different.

"Now, I want to point out that both consultants are well respected, have been around for a number of years and have many referenceable clients. They are in no way amateurs or moonlighters, yet the communications went from bad to worse. Verbal discussions between them were broken off and supplanted by letters, later by a telegram and then by non-communications.

"Looking over the situation after being called in, I felt my job was clear enough — to get them talking to each other again. After only a few conversations with each consultant on an individual basis, I was able to develop enough understanding and trust that I believed a phone call between them could open the channels.

"Well, it worked. By the time the call was over, compromises were reached concerning the contracts and schedules, the project was back oo track snd the office manager will get the automated assistance he requires.

"Each consultant still has his own idea of what the minimum requirements are to develop specifications properly, but now they understand the other's point.

"Whst can we learn from this experience? Here are some conclusions:

- All of the promises of electronic mail aside, written communication does not provide the "real-time" give and take that is so important for human beings to understand each other.
- Written communication may be osed to confirm verbal communication.
- DP terminology is not exact and the extra time spent in carefully defining 'deliverables' will have immediste payback.

(Continued on Page 37)

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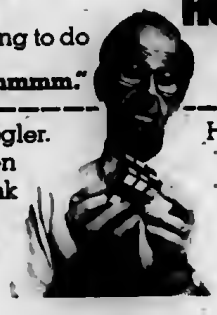

Hummm, Lear Siegler. You've certainly given me something to think about. I asked my distributor about the Hummm Terminal.

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LETTERS

Codes and Lists

In response to the letter of Dale O. Brandser [CW, July 6], it seems to me that the essence of the problem mentioned is to produce a list of customers whose volume of business is over 1,000, with the total number of such customers and their aggregate volume of business at the end of the list.

Brandser's code seems to place too much emphasis on the physical printing on the list rather than on what is supposed to be on the list.

The following is a rearrangement of his code which, I hope, more clearly represents the problem:

```
PROCEDURE DIVISION.

000-MAIN-PROCESS.

  PERFORM 900-INITIALIZATION.
  PERFORM 100-PROCESS-CUSTOMER
    UNTIL END-OF-FILE = "Y".
  PERFORM 999-TERMINATION.
  GOBACK.

100-PROCESS-CUSTOMER.

  IF CUSTOMER-VOLUME GREATER THAN
        1000.0
    PERFORM 200-PUT-CUSTOMER-ON-LIST.
  PERFORM 400-GET-A-CUSTOMER.

200-PUT-CUSTOMER-ON-LIST.

  MOVE SPACES TO CUSTOMER-LINE.
  MOVE CUSTOMER-NUMBER TO CUSTOMER-
        NUMBER-OUT.
  MOVE CUSTOMER-NAME TO CUSTOMER-
        NAME-OUT.
  MOVE CUSTOMER-VOLUME TO CUSTOMER-
        VOLUME-OUT.
  PERFORM 300-PAGINATION.
  ADD 1 TO CUSTOMER-COUNT.
  ADD CUSTOMER-VOLUME TO TOTAL-VOL-
        UME.

300-PAGINATION.

  IF LINE-COUNTER GREATER THAN 55
    PERFORM 500-NEW-PAGE
    MOVE ZERO TO LINE-COUNTER.
  MOVE CUSTOMER-LINE TO PRINT-LINE.
  WRITE PRINT-LINE AFTER ADVANCING 1-
        LINES.
  ADD 1 TO LINE-COUNTER.

400-GET-A-CUSTOMER.

  READ CUSTOMER-FILE
    AT END MOVE "Y" TO END-OF-FILE.

500-NEW-PAGE.

  MOVE TITLE-LINE TO PRINT-LINE.
  WRITE PRINT-LINE AFTER ADVANCING TOP-
        OF-PAGE.

  MOVE HEADING-LINE-1 TO PRINT-LINE.
  WRITE PRINT-LINE AFTER ADVANCING 2
        LINES.

  MOVE HEADING-LINE-2 TO PRINT-LINE.
  WRITE PRINT-LINE AFTER ADVANCING 1
        LINES.

  MOVE SPACES TO PRINT-LINE.
  WRITE PRINT-LINE AFTER ADVANCING 1
        LINES.

900-INITIALIZATION.

  OPEN INPUT CUSTOMER-FILE OUTPUT
        PRINT-FILE.
  PERFORM 500-NEW-PAGE.
  PERFORM 400-GET-A-CUSTOMER.

999-TERMINATION.

  MOVE TOTAL-VOLUME TO TOTAL-VOLUME-
        OUT.
  MOVE CUSTOMER-COUNT TO MAJOR-
        COUNT-OUT.
  MOVE TOTAL-LINE TO PRINT-LINE.
  WRITE PRINT-LINE AFTER ADVANCING 2
        LINES.
  CLOSE CUSTOMER-FILE PRINT-FILE.
```

Jim Burkett
Instructor

Washtenaw Community College
Ypsilanti, Mich.

Developing Skills

Werner Frank's Softline article [CW, July 13] has stimulated my thinking about programmer training and resulting productivity.

As a math professor, I have had the opportunity to study the mental development of abstract skills from basic algebra through postdoctoral studies.

As a software project leader for a 10-man-year development project, I have observed a broad spectrum of skills in application programmers. In order to implement the procedures suggested, it is essential that the programmer's skill with abstraction be developed beyond that of the average application programmer.

Most striking in my limited observations is that the average Cobol-oriented programmer deals with abstractions at about the second-year-algebra level. In contrast, scientific and systems programmers frequently deal with abstractions at about the level of a college junior in mathematics or computer science — a difference of three years of mathe-

(Continued on Page 38)

Communicating Begins at Home

(Continued from Page 35)

• Professional guidelines would be a useful tool.

DP Certification

"This last point brings me to this observation. There are a number of groups around the country that would like to see the certification of DP professionals. Yet, many of us wonder how we can certify someone's ability when no widely accepted standard exists. In the case cited above, both consultants — knowledgeable and experienced — validly defended their interpretation of the term 'specifications.'

"To help define some guidelines in this area, I propose establishing an ad hoc committee of interested individuals in and out of ICCA to begin development of appropriate documentation. We must remember our industry is growing and changing rapidly. A stiff structure today would be too brittle to stand the test of time."

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(Continued from Page 37)

matical education or experience between these two levels.

I believe Frank's suggestion of increased use of standardized modules and application generators will lead to increased productivity. But it must be recognized these require a higher level of abstract skill development.

I would recommend to anyone who is considering such techniques for increased productivity to also study the training and experience of their staff. Project leaders should have the training or experience that results from a good college course in data structure, operating systems, mathematical statistics or standard calculus. Others should be encouraged to achieve this skill level.

Such training, together with modular and structured techniques, could easily double productivity.

Robert D. Moyer
Associate Professor
Of Mathematics

University of Kansas
Lawrence, Kan.

LETTERS

On Importing DPers

I'm glad to see public discussion of the issue of importing foreign DP workers has been sparked, even if the response was a rather hyperbolic defense of this practice [Keith Adney's letter, CW, July 20].

The influx of foreigners into the U.S. technological work force has been going on for some time, but has accelerated in recent years. Perhaps they are not very evident out there in Memphis, but contrary to Adney's statement, there are more than just a "few" foreigners in the U.S. DP work force, and unless political pressure is applied, there will be many more.

The importation of foreigners has developed in some industries to the point where it is used as a "whip" by some companies to keep American engineers' salaries depressed and to keep American workers in line generally. Adney seems to regard concern over this trend developing in DP as evidence of a crybaby attitude or, worse, a desire for the economic advancement of the U.S. DPer. "The purpose of automating American business is not to make a few programmers and analysts rich."

Obviously there are complex economic — as well as social — tradeoffs involved in importing foreign labor. Adney listed some of the advantages that he says accrue to the U.S. as a whole. Other than the supposed head start in automation that this practice gives us, all the "advantages" he outlined stem directly from the depressing effect on salaries.

By all means we should fill our immigration quotas for various countries with DPers. But are we really better off in the long term when we *import* garden-variety programmers and analysts to avoid having to train our existing citizenry or to avoid a short-term upward adjustment in DP salaries? If these people offer such critical, unavailable skills, why are they only being offered salaries in the $24,000-to-$32,000 range, as the *Computerworld* article stated?

Unlike Adney, I believe this country is better served by having a well-paid, or even highly paid, highly respected DP work force, and I believe the relatively desirable jobs this industry provides should be filled by Americans first. I would urge like-minded readers to write their congressman and express their concern.

Dave Johnson

Ringwood, N.J.

No Human Factor

Wharton's computer model ["Nobel Winner's DP Model Disputes Reagan Tax Plan," CW, July 20] is just about as valuable as the program that predicted a Philadelphia Eagles victory in the Super Bowl last January. It is wrong, and for the same reason — no human factor.

Reagan's tax-cut plan will work because of the human factor.

A.W. Norton

Sacramento, Calif.

Computerworld welcomes comments from its readers. Preference will be given to typed, double-spaced letters of 150 words or less. Letters should be addressed to Editor, *Computerworld*, 375 Cochituate Road, Rt. 30, Framingham, Mass. 01701.

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Sept. 2 Boston, MA
Sept. 8 San Francisco, CA
Sept. 9 Washington, DC Area
Sept. 15 Denver, CO
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Micros and Software Architecture

(Continued from Page 35)

cessing monitor and no need for reentrant code. Resource scheduling is unnecessary, as is the case for sequencing and controlling jobs. Even machine accounting is unnecessary — at least as it affects collecting data necessary for chargebacks or the like. The computing resource has become a "throw-away" item, an expendable; the resource, a piece of personal furniture.

Communication for I/O has been localized and can be tuned or even microcoded to specific devices. Generality can be displaced. All in all, the underlying software environment for the workstation has simplified considerably.

New Requirements

But this environment introduces some new requirements as well. User orientation and convenience become paramount. Not only must the interactive screen be responsive to varying user experience and background, but it must also be adaptive. Steady users, over time, want to be able to dynamically redirect dialogues by shortcutting standard procedures when the path is well-known or often repeated. Thus, a user-defined, screen-oriented "macro" becomes a necessary function.

Tutoring and the help function are also desirable features, as are user-directed and performed software and hardware diagnostics. Indeed, this calls for some innovations in software maintenance.

Another impact on software design and structure relates to the decoupling of some operating functions from the main computer to the workstation. Application software has to be functionally separated into meaningful front- and back-ended pieces that can rationally be executed at the workstation and at the loosely coupled central computer.

This latter requirement is no mean trick. It immediately raises the familiar problem of deciding what data shall be held in the local storage of the workstation and how this local data will be coordinated with the central data bank. The problem is complicated by the need to keep in step with the local data employed by sister workstations. These design decisions are related to the degree of local edit and validation that is intended for the data entry functions and how independent the local workstation can be from the centralized data bank in the case of the query and reporting operation.

No Simple Answer

There is, of course, no simple or single answer. The question needs to be resolved for each specific application.

Needless to say, the basic design must accommodate these identified functions, and the system must be appropriately triggered either to operate with local data or seek access to the centralized files.

A final requirement for this new software will be to provide workstation users with implementation assistance for solving ad hoc processing problems which come up from time to time. While standard information retrieval and reporting may be the most common of such functions, there will also be a need for more specific, application-oriented problem solving. Hence, a set of software tools is called for — tools properly shaped and aimed for different classes of users, ranging from the skilled programmer to the more casual end-user.

This latter requirement will surely challenge software designers in this decade.

Frank is executive vice-president of Informatics, Inc. in Woodland Hills, Calif.

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IBM Disk Users Get 'Instant-FBA' For Simulation

SAN MATEO, Calif. — SDI, Inc. has released software called Instant-FBA to provide transparent compatibility between all IBM disk devices. Instant-FBA is said to allow a real disk of any type to simulate any other type of disk device, including the simulation of count key data (CKD) devices on fixed-block architecture (FBA) disks and vice versa without changes to programs or job control streams.

The product reportedly eliminates conversion efforts when changing disk devices and removes incompatibilities between IBM access methods and the newer disk types.

With Instant-FBA, it is possible to place Isam and direct-access files on an FBA device by using a portion of the FBA disk to simulate a CKD device, the vendor said.

The system is said to support any combination of IBM 2311, 2314, 3330, 3340, 3350, 3310, 3370 and 3380 disks as real or virtual devices. The virtual devices can be full-size disks or minidisks, depending on the amount of direct-access storage device storage required, SDI said.

Instant-FBA supports the DOS/VSE and DOS/VS operating systems and is available on six-month and two-year lease plans, with prices starting at $90/mo.

The vendor is located at 1700 S. El Camino Real, San Mateo, Calif. 94402.

Audit Package Helps Bank Capitalize on Portfolio

By Lois Paul
CW Staff

MINNEAPOLIS — A savings bank here discovered that 50% of its portfolio of mortgage loans were at interest rates below 4.5% by conducting a frequency routine with its newly acquired auditing software package.

F&M Savings Bank had installed Pansophic Systems, Inc.'s Panaudit in January 1980 and Norman G. Morrison, its director of internal auditing, said he tried the routine after a meeting with senior management in which variations in interest rates were discussed.

"We said, let's try it and see what we get," Morrison explained. "We were doing a mortgage audit at the time. We ran a frequency analysis of the interest rates — dollar volume loans by interest rates."

"It came out very surprising," he said. "They knew it was bad, but I guess they weren't able to put all the numbers together in terms of the servicing portfolio and the in-house portfolio."

Morrison continued, "It came out with something like 50% of the portfolio loans at less than 4½% and obviously that means senior management made quite a few changes to their strategy in terms of trying to restructure that portfolio for long-range planning."

The bank looked at a variety of audit packages before choosing Panaudit and budgeted the time necessary to install this type of software at about 3,200 man-hours.

"Many packages required more time than this. Pansudit had 75 routines we could use almost immediately," he said.

Morrison explained that, as a thrift organization, F&M Savings has nearly 80% of its assets invested in mortgage loans. With rising interest rates, loans that used to be paid off within eight years are now being extended to about 14 years.

"What is happening, then, is people that have these older loans — they are being assumed or are not being paid off by any means — what they call it is creative financing," Morrison said.

"So, instead of getting a nice investment strategy that allows a lot of cash flow yearly and a payoff every eight years, it's lengthened out considerably and, in addition, the full company investments now are in these longer term assets at a much lower yield. So the earnings are substantially less."

Refinance Efforts

Bank management has been spending more effort in the refinance areas, Morrison said, to get some of these old portfolio loans off the books.

One way this is being accomplished is by refinancing, which gives people the option to borrow at 80% of their current rate of value, which is obviously a higher rate, he said.

"It is below market rate, but, still, some of them were going from 5% to 12-7/8%, so we are getting a much higher yield," Morrison said.

The bank has in the works several refinance campaigns on a mass mailing basis to be targeted at the low-income loans.

Morrison explained that before 1976 in Minnesota there was a clause in mortgages that indicated lenders did not have to take assumption even if the borrowers had good credit.

This enabled the lender to provide new financing at a higher rate, which subsequently raised the ire of many consumers. There were a number of court cases contesting the lenders' advantage with this system, but these were won by the banks, according to Morrison.

"One of the strategy changes we made here was to go ahead and call all those loans, sending a letter out to all the brokers saying our portfolio is so long and at so low a rate, we either go bankrupt or do something about it," he said.

The strategies are working, Morrison

(Continued on Page 42)

Goal Systems Software Enhances Control of IMS/DC User Sites

COLUMBUS, Ohio — Goal Systems International, Inc. has introduced a software package designed to provide enhanced control of IBM's IMS/DC data base management system environment. Goal also announced a maintenance enhancement package for Partitioned Dataset System (PDS) libraries running under IBM MVS and OS/VS operating systems.

IMS/Access (Automated Command Control and Extended Support Services) was developed to provide a facility for the IMS master terminal operator and other authorized users to employ when controlling an IMS/DC system, the vendor said.

It is said to provide control of the IMS/DC environment through the automation of time-consuming tasks.

Pdaman is a Partitioned Dataset Management System that reportedly provides productivity aids for all types of PDS libraries, including load libraries and libraries that have been updated using System Productivity Facility (SPF).

It also features audit control and reporting of library activity, including date and time of last access and last update.

The management and control functions of IMS/Access consist of command grouping, a summary display facility and multiple master terminals. The IMS/DC master terminal operator commands can be placed on the data base and executed by any authorized terminal operator, the vendor said.

The summary display facility reportedly provides authorized terminal operators with displays of the status of IMS transactions, data bases, Vtam nodes and logical terminals.

Pdaman includes library backup, incremental backup and archive backup capabilities. Its other features are centralized PDS control, reduced library direct-access space requirements, compression aids and facilities for dealing with contention and integrity problems.

All Pdaman facilities are SPF- and TSO-compatible, the vendor said. The IMS/DC and Pdaman software packages are priced at $9,000 each. Goal Systems International may be reached at P.O. Box 29481, Columbus, Ohio 43229.

For VM/CMS, MVS Systems

'Focus' Adds Multiscreen Ability

NEW YORK — Release 3.9 of its Focus data base and information control system for IBM and plug-compatible systems operating in VM/CMS and MVS environments was announced here by Information Builders, Inc.

Multiscreen processing is a new feature in the Focus Interactive Data Entry Language (Fidel), which reportedly enables users to develop full-screen 327X data entry and display applications for Focus data base files. With the release, Fidel is said to support the specification of separate screen formats and processing logic for multitransaction input streams, enabling each transaction type to be treated as a distinct unit or case.

Any single screen can consist of several "windows" that are treated as separate logical areas for data entry or display, according to Information Builders.

Focus 3.9 also has features in the areas of custom reporting, data base integrity, full-screen enhancements to the Focus Dialog Manager and a Focus Session Monitor.

The Focus Session Monitor reportedly can save user input statements and Focus output from the terminal session. It then enables the user to scroll back and review the session chronology from the point that the session monitor was activated, the vendor said.

Focus 3.9 is scheduled for initial availability in September 1981. It is available through TSO, CICS and IMS/DC, the vendor said, and ranges in one-time license fees from $66,000 to $106,000, depending on options selected. It also can be leased for a monthly fee ranging from $1,680 to $2,900, depending on options.

Information Builders, Inc. is located at 1250 Broadway, New York, N.Y. 10001.

ADR Offers 'Datacom/DB' Users Vsam Transparency Tool

PRINCETON, N.J. — Applied Data Research, Inc. (ADR) announced a Vsam Transparency Option that reportedly will allow existing Vsam applications written in Cobol to operate with its Datacom/DB data base management system (DBMS) and will aid conversions to Datacom/DB from Vsam file access approaches.

ADR utilities will load Vsam files into Datacom data bases, which can then be accessed by existing Vsam programs via the Vsam Transparency or by programs using standard Datacom/DB requests, ADR explained.

The Vsam Transparency Option is said to provide an almost limitless availability of applications packages to users of Datacom, a synchronized full-function DBMS for the Vsam-written user programs and enhanced data resources control through Datadictionary. The permanent license for the Vsam Transparency Option is available for $6,000 for DOS/VS sites and $7,000 for OS/VS sites. Monthly, three- and five-year leases also are available.

The Vsam Transparency Option is scheduled for release in September 1981, the vendor said from Rt. 206 and Orchard Road, CN-8, Princeton, N.J. 08540.

Audit Software Monitors Usage of Model 204 DBMS

CAMBRIDGE, Mass. — Computer Corp. of America announced an optional auditing component for its Model 204 data base management system (DBMS). Audit/204 was designed to provide audit functions to monitor DBMS usage by individual users, to monitor usage of individual DBMS files and to provide accounting and billing facilities for system usage.

The software is comprised of the journal file, which contains details of all activity involving the DBMS, and a specialized report writer utility. These reportedly enable a user to produce reports on or off-line, covering such information as who accesses the system, when they access it and from which terminal, according to the vendor.

Information also can be presented in terms of how often a particular file is accessed, the level of update activity and who the users are. Both types of reports may be accompanied by changing statistics related to CPU time used, disk reads and writes and other events, the vendor said.

Audit/204 is available as an option with Model 204 DBMS and costs $20,000, Computer Corp. of America said from its headquarters at 675 Massachusetts Ave., Cambridge, Mass. 02139.

VAX Users Get 'VFM' Update

TULSA, Okla. — Viking Software Services, Inc. has announced an enhanced version of its Forms Manager package for Digital Equipment Corp. VAX users.

The Viking Forms Manager (VFM) is a development utility used to create, operate and maintain end-user and data entry application programs in an interactive environment, the vendor said.

Version 1.1 enhancements include a search facility added to the Data Entry System. The feature is said to allow the terminal operator to search the file for records meeting a variety of conditions.

VFM consists of four major components: Forms Development Facility, Execution Time Subroutine Library, VFM Exerciser and the Data Entry System, according to the vendor.

Version 1.1 is free to VFM users. VFM costs $8,000, the vendor said from Suite 816, 2800 Center Building, 2815 E. Skelly Drive, Tulsa, Okla. 74105.

Audit Package Helps Bank

(Continued from Page 41)

said, and the bank has put out $20 million in new money at a much higher rate. The plan is to put out about $40 million in new money each year, he said.

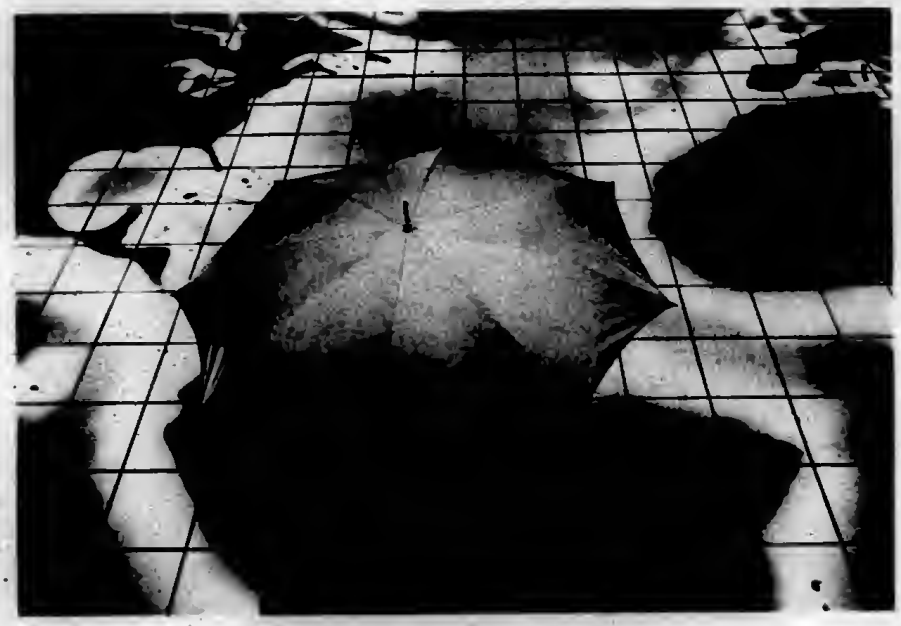
"It has had a real positive effect on our cash flow."

He described F&M Savings as a more than one billion dollar savings bank that has had DP support since the '50s. Its DP department uses IBM 370 and 3031 mainframes, which provide 3M bytes of storage. There are eight tape drives and 12 disk drives.

The CMS operating system was installed in 1980, he said, and it has almost entirely reduced the need for keypunch staff. IBM's CICS system software also is used.

The bank uses Pansophic's Panvalet library management software and Panexec, which was purchased as additional security and to provide backup control, he explained.

The bank also employs Easytrieve, Pansophic's information retrieval and data management system.



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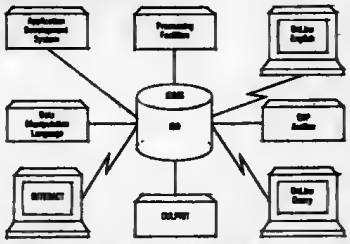

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8	Kansas City, MO	17	Boston, MA	29	Quebec City, QUE	7	Syracuse, NY	27	Seattle, WA
8	Minneapolis, MN	17	Dearborn, MI	**OCTOBER**		7	Tampa, FL	27	Tulsa, OK
8	Norfolk, VA	17	Houston, TX	1	Calgary, ALT	7	Toledo, OH	28	Ft. Wayne, IN
8	Winnipeg, MAN	17	Savannah, GA	1	Des Moines, IA	20	Philadelphia, PA	28	Vancouver, BC
9	Poughkeepsie, NY	17	Washington, DC	1	Erie, PA	20	San Antonio, TX	29	Akron, OH
10	Albany, NY	22	Chicago, IL	1	Winston-Salem, NC	20	San Juan, PR	29	London, ONT
10	Dallas, TX	22	Columbia, SC	9	Albuquerque, NM	21	Sioux City, IA	29	Roanoke, VA
10	Morristown, NJ	22	Montreal, QUE	6	Allentown, PA	22	Dayton, OH	**NOVEMBER**	
10	New York, NY	22	Omaha, NE	6	Binghamton, NY	22	Meadowlands, NJ	3	New Orleans, LA
15	Fredericton, NB	24	Atlanta, GA	6	Hartford, CT	22	Knoxville, TN	3	San Diego, CA
15	St. Louis, MO	24	Cleveland, OH	6	Milwaukee, WI	22	Manchester, NH	3	Sioux Falls, SD
15	San Francisco, CA	24	Denver, CO	6	Portland, OR	22	New York, NY	4	Baton Rouge, LA
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CW 8-10

'Streaming Software' Runs on DG

SANTA CLARA, Calif. — "Streaming software" that enables the continuous transfer of data from disk to tape for Data General Corp.'s Nova and Eclipse minicomputers is available from Spectra Logic Corp. Called Spectra Stream Rdos, the DG Rdos operating system-based software reportedly was designed for both start/stop and streaming ½-in. formatted tape drives.

The package was designed as a stand-alone program to stream Rdos-compatible disks to formatted 100 in./sec streaming tape drives via the vendor's Spectra 20 emulating, multifunction disk/tape controller.

Spectra Stream is said to utilize a sector map that plots out available sectors on the disk, rather than having to selectively read material from blocks of used and unused data.

In addition to its literal disk backup capability, the Spectra Stream software reportedly offers error handling as a standard feature. The utility goes back over the same piece of data seven times for error verification. If, after the seventh try, the error has not been corrected, it is reported and the streaming process stops.

Spectra Stream Rdos is available on DG/Ansi-compatible 800 or 1600 bit/sec magnetic tape for a one-time $500 charge, the vendor said from 1227 Innsbruck Drive, Sunnyvale, Calif. 94086.

Business Packages Announced For Nova and Compatible Users

LINDENHURST, N.Y. — Dynacon Corp. has announced 17 general business packages that run on Basic Interactive Time Share (Bits), its multiuser operating system for Data General Corp. Nova-compatible computers. The general business packages were designed to perform as an integrated system.

Packages include accounts receivable, invoicing, accounts payable, payroll, general ledger, inventory control, inventory financing and cash register processing modules. Vertical market packages including market, dental and professional corporation benefits are also available, the vendor said.

Bits costs $3,500. The business software packages range in price from $2,500 to $5,000 each from 410 E. Shore Road, Lindenhurst, N.Y. 11757.

Exchange Utility Fits Series 80

PALO ALTO, Calif. — A Data Exchange Utility software package from Hewlett-Packard Co. is said to allow HP Series 80 personal computers to exchange data with larger systems via 8-in. flexible disks.

The software works with the HP 9895A 8-in. flexible disk drive to transfer character data between an HP 85 or HP 83 and large systems supporting IBM 3740 formatting for 8-in. flexible disks.

The software also makes it possible for the Series 80 to exchange data with other HP computers. By converting a Series 80 data file to a 3740 data file and then translating the file to the appropriate HP system format, the data can be read and analyzed by an HP 250, 3000, 9835 or 9845.

The software costs $95 from the firm at 1501 Page Mill Road, Palo Alto, Calif. 94304.

Prime Users Get Retrieval Pack

COLUMBUS, Ohio — Batelle Columbus Laboratories has announced an information retrieval system for Prime Computer Corp. processors.

An extension of Basis, the firm's data management system, the package allows Prime users to search index and actual data records and perform index, hierarchical, universe and mapped searches, according to the vendor.

In addition, transaction profiles can be generated and information sorted on-line or put into a thesaurus where vocabulary can be standardized, the vendor said.

The package costs $16,000 for Prime users, the vendor said from 505 King Ave., Columbus, Ohio 43201.

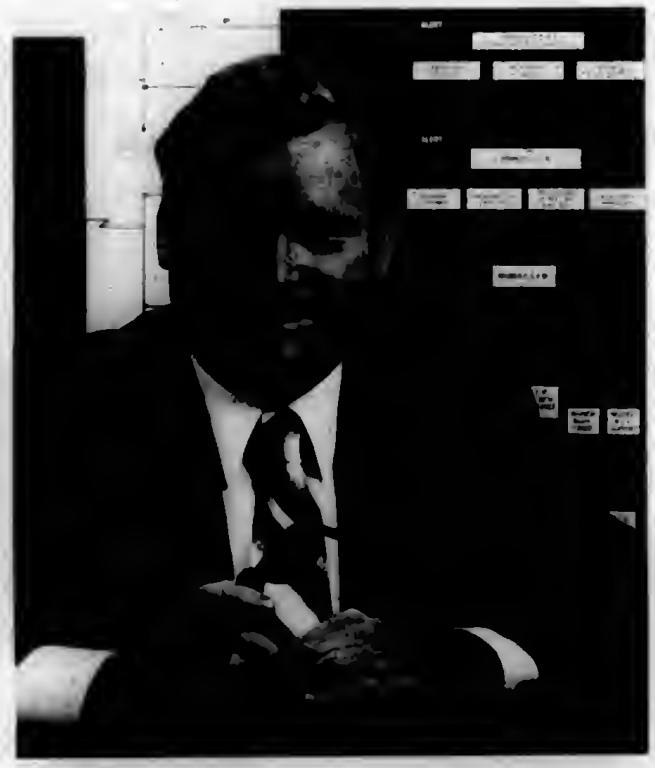
Converter Goes Xerox-to-IBM

NEW YORK — OLI Systems, Inc. has completed a Xerox Corp. Sigma-7 Fortran-to-Fortran IV converter that can be used with the IBM 4341 system.

The development and support of the converter was a joint project with ARA Automation of Holland and the Plan Q Conversion Factory of Philips N.V.

The converter has been added to the OLI conversion library and is available for $6,000 for in-house installation or through National CSS, Inc.'s time-sharing system, the vendor said.

More information is available from the vendor at Suite 607, 421 Seventh Ave., New York, N.Y. 10001.



Mr. Fred R. Meier, President, Business Machines Group, Burroughs Corporation.

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For Financial Modeling

'MPS-F' Interfaced With RSI Oracle

MENLO PARK, Calif. — MPS Management Consultants' MPS-F Financial Modeling and Planning System was interfaced to Relational Software, Inc.'s (RSI) Oracle relational data base management system (DBMS) for use on Digital Equipment Corp. VAX-11 computers operating under VMS, RSI announced here.

Oracle is said to provide an SQL language facility, screen processing and a report writer. It incorporates an integrated data dictionary and provides host language interfaces for Cobol, Fortran, PL/I, C, Pascal and Assembly languages, according to the vendor.

MPS-F is an integrated financial modeling and simulation package incorporating a financial modeling language. When used with Oracle, MPS-F financial data is stored as "tables" in an Oracle data base, the vendor said.

MPS-F reportedly accesses Oracle when processing "model logics" during the course of extracting data for the calculations, allocations, eliminations and iterations performed by the financial modeling language.

RSI noted that the full range of SQL relational operators can be used against the data and this data can be related to nonfinancial data for other organizational requirements.

MPS-F is said to utilize the Oracle Interactive Application Facility (IAF) to provide screens for interactive entry of financial data. A utility automatically generates these screen definitions from financial worksheets, the vendor said, and IAF allows the user to interactively establish the data for the model.

MPS-F licenses are available for $19,000 (Canadian) from Management Consultants Ltd. in Willowdale, Ont. Oracle can be obtained for $48,000 from RSI at 3000 Sand Hill Road, Menlo Park, Calif. 94025. There is no charge for the MPS-F/Oracle interface if users have both software packages, the vendors said.

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Harris Gives Superminis Accounting Aid

FORT LAUDERDALE, Fla. — Five accounting packages were introduced by Harris Corp. for its line of superminis. The Acuity accounting software includes project management, payroll, general ledger, accounts payable and accounts receivable.

The Acuity project management package is said to offer information monitoring both project substantive progress and project profitability. It reportedly maintains a uniform, centralized data base from which project billing parameters and customer information can be derived.

The Acuity payroll system was designed to provide flexibility in fringe benefit handling, deductions, activity monitoring, overtime, holiday and sick leave.

The Acuity general ledger system features user-defined financial statement formats. The Acuity accounts payable system is an accrual system, which reportedly allows control over disbursements and provides expense analysis reports on demand.

An open item and/or balance forward system, the Acuity accounts receivable system produces reports including accounts receivable aging, cash receipts journal and accounts receivable distribution.

The five Acuity financial information packages reportedly can interface with one another and are offered at licensing fees ranging from $4,000 to $5,000 each.

Harris Corp.'s Computer Systems Division is located at 2101 W. Cypress Creek Road, Fort Lauderdale, Fla. 33309.

NIS Offers Lease Analysis On Time-Share

CUPERTINO, Calif. — Lease analysis software for banks, leasing companies, investment bankers and major corporations was announced here by National Information Systems, Inc. (NIS). The QLM package presently runs on Digital Equipment Corp.'s Decsystem-10 and Decsystem-20 computers and is available nationally on NIS' time-sharing services.

QLM was designed for the lessor's analysis of the complex leveraged or single-source leases involving exact dating, multiple deliveries with interim rents and loans, multiple assets, terms up to 30 years and unusual tax situations, according to the vendor.

It reportedly is targeted for current or prospective users of leveraged leasing programs. QLM produces reports such as critical summary, pricing summary, amortization schedules and cash flow and yield analysis.

The software package can be purchased for $85,000 and leased or accessed through NIS' time-sharing network, the vendor said from Suite 245, 20370 Town Center Lane, Cupertino, Calif. 95014.

PDP-11s Get Utility Aids

SANTA ROSA, Calif. — Olympic Systems, Inc. has introduced Programmer Utility Aids for Digital Equipment Corp. PDP-11 users.

The software includes a program to produce cross-reference listing for Basic-Plus and Basic-Plus-2 programs; a program that builds record I/O files for program testing; and a program for displaying selected file records in single-line record format, according to Olympic Systems.

The software is written in Basic-Plus and operates in 32K bytes of memory under RSTS/E.

The products can be purchased separately, or as a package for $130 from the firm at 410 Macklyn Ave., Santa Rosa, Calif. 95405.

Tool Handles Deposit Boxes

ATLANTA — Software Concepts, Inc. has unveiled a safe deposit box accounting system designed to eliminate the manual process of box keeping.

Designated Safe Box Accounting (SBA), the software performs the major functions of recordkeeping and can handle a multibank operation. It performs automatic billing, maintains a data base and performs other special functions.

SBA is a batch-oriented system and costs $4,500 for a single-bank system and $9,500 for a multibank system, SCI said from 1450 Atlanta Center, 250 Piedmont Ave., N.E., Atlanta, Ga. 30308.

MSA Accounting Package Handles On-Line Entry

ATLANTA — Management Science America, (MSA) Inc. is offering an accounts payable system that handles data entry, error recovery, invoice/vendor inquiry and processing controls.

Online Accounts Payable System is interactive; as an entry is made, errors are automatically displayed for duplicate invoices, invalid vendors, invalid general ledger distribution, balancing errors and other system controls and alerts, MSA said.

The system reportedly provides information at all levels, including vendor history and open and paid invoices information. A vendor name search automatically displays all the complete names of vendors and the vendor number assigned.

The system costs $15,000 from MSA at 3445 Peachtree Road, N.E., Atlanta, Ga. 30326.

HP 3000 Gets Food, Dairy Aid

MINNEAPOLIS — An on-line interactive food and dairy system for the Hewlett-Packard Co. 3000 computer systems has been announced by Q.E.D. Systems, Inc.

The system makes specific provision for preordering by calling list or post-delivery invoicing, maintaining customer par inventory by product and delivery, multiple wholesale land retail price lists and inventory accounting and reconciliation, the vendor said.

The complete system is menu-driven and is available for a one-time license fee of $27,500, including installation from Q.E.D. Systems, Inc., 106 Glenwood Ave., Minneapolis, Minn. 55403.

Systems Covers Law Firm Time

RED BANK, N.J. — A legal time accounting system for Texas Instruments, Inc. DS990 computers has been announced by Dymax Systems, Inc.

Dylaw was designed to automate and control a law firm's accounting and billing while providing the information needed to allow a firm to assess its financial status through the generation of various reports, the vendor said.

The system is written in Cobol utilizing the company's DX10 operating system and comes with complete system and user documentation, the company said.

Dylaw is priced at $8,000 from Dymax Systems, Inc., 157 Broad St., Red Bank, N.J. 07701.

Graphics Package Handles Geographics

KANSAS CITY, Mo. — A graphics package for the processing of geographic information said to organize, manipulate, analyze and edit related data for graphics display has been announced by United Information Systems, Inc.

Odyssey programs apply statistical data to a cartographic data base (CDB) and then display the results as two- or three-dimensional monochrome or color maps.

The company offers four program modules of the system used for the generation of two- and three-dimensional maps, CDB manipulation and conversion of chain-type CDB files for input into the two-dimensional mapping module, the company claimed.

Odyssey is priced according to program use, and information is available from United Information Systems, Inc., P.O. Box 8551, Kansas City, Mo. 64114.

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'UCC APO' Serves IBM, Burroughs CPUs

DALLAS — University Computing Co. has announced the Accounts Payable Online System (UCC APO) for IBM medium to large systems operating under DOS and OS and Burroughs Corp. mainframes.

This software package is said to support entry, full editing and inquiry for accounts payable and purchase order control functions, as well as on-line correction to the rotating error file.

UCC APO reportedly provides security through command-level CICS, and additional security through the application, featuring restrictive company, file and transaction access.

The data entry function incorporates editing of transactions, including the validation of general ledger account distribution numbers, vendors, banks and companies, the vendor said.

UCC APO also is said to perform batch and transaction balancing, as well as the update and correction of batches, CRT terminal screen mapping, data field prompting and a recap display of batches are available, according to UCC, and batches can be selectively released to UCC's Accounts Payable System through several options.

The inquiry function reportedly allows access by 10 different keys or any combination of those keys.

The UCC APO package is priced between $24,000 and $60,000, depending on the configuration and the modules selected, the vendor said from UCC Tower, Exchange Park, Dallas, Texas 75235.

Cobol Development Tools Fit Burroughs Minis

AMHERST, Mass. — Intelligent Software Systems, Inc. has announced three software tools for development of Cobol applications on Burroughs Corp. minicomputers:

- Screeno is an on-line screen design, storage and retrieval program said to automatically generate error-free Cobol working-storage source associated with I/O data streams.
- Namecheck reportedly finds all typographical errors and undeclared names in a Cobol source program. Execution typically requires 10% to 30% of compilation time.
- Sourcewriter allows standard portions of Cobol source files — file descriptors, identification and environment divisions — to be rapidly generated through a series of on-line form screens.

Screeno costs $1,750, while Namecheck and Sourcewriter each sell for $500 from the firm at P.O. Box 621, Amherst, Mass. 01004.

Codex Users Get Forms Facility

MANSFIELD, Mass. — A software facility said to allow programmers of distributed data entry and inquiry applications to design, test and document full-screen forms has been announced by Codex Corp.

The Forms design facility works with Cobol on the company's CDX-68/20 and 40 Intelligent Terminal Systems and includes a design, test and access facility, the vendor said.

Forms licenses for a one-time fee of $125 from Codex Corp., 20 Cabot Blvd., Mansfield, Mass. 02048.

Unit Automates Radiology Units

PAOLI, Pa. — An on-line software system designed to automate hospital radiology department functions now performed manually has been announced by Custom Programming Group, Inc.

The Radiology Index is written in Ansi Cobol 74 to run on a Four Phase Systems, Inc. minicomputer using the MFE operating environment, the vendor said.

The Radiology Index is priced at $12,000, including up to 160 man-hours for modification, from Custom Programming Group, 108 S. Valley Road, Paoli, Pa. 10301.

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Random Notes

'Extracto' Users Form Group

ATLANTA — A users group with branches in the U.S. and Canada has been formed for users of the Extracto report writer and file management software developed by Insurance Systems of America.

The Extracto Users Group (Exus) was established to encourage the interchange of ideas and experiences, facilitate dissemination of product information and provide feedback for future enhancements. Any organization having leased or purchased Extracto or a software package incorporating Extracto is eligible for membership.

More information can be obtained from the Association Des Usagers D'Extracto, P.O. Box 615, Stock Exchange Tower, Montreal, Quebec, H4Z 1J8 or Extracto Users Group, ISA, P.O. Box 47975, Atlanta, Ga. 30362.

Service Automates Car Location Reports

DEERFIELD, Ill. — The Kleinschmidt Division of SCM Corp. has announced a service for the automated collection and distribution of car location movement (CLM) reports on rail shipments.

Available through the GTE Telenet, Inc. network, the CLM Service provides shippers with a centralized source of CLMs from their reporting rail carriers.

Collections are made every day of the year; Kleinschmidt operates around the clock. Using GTE, transmission rates are 300- or 1,200 bit/sec; CPU-to-CPU communication is also possible. SCM is located at 450 Lake-Cook Road, Deerfield, Ill. 60015.

Module Forecasts Inflation's Impact

ANN ARBOR, Mich. — A forecasting module that uses current cost and constant dollar accounting techniques to assess the future impact of inflation on a company's business has been added to Vscom-33, a timeshared current value compliance system offered by Comshare, Inc.

With the module, users can make up to five-year forecasts based on asset data, anticipated capital additions and other company parameters, the vendor said.

Pricing is based on an as-used basis and the firm said the module used by an average company with 1,000 records on a five-year plan would cost about $1,500. More information is available from the vendor at 3001 South State St., Ann Arbor, Mich. 48106.

Abstract Service Covers European Publications

LOUISVILLE, Ky. — Data Courier, Inc. is offering abstracts of European business and management publications on its ABI/Inform data base.

The screening, translating and abstracting process is a joint effort between the vendor and Anbar Management Publications of England. The data base will offer full text retrieval, the vendor said.

The ABI/Inform data base is currently available on three public networks: Dialog, from Lockheed Electronics Co., Inc., Orbit, from Systems Development Corp., and BRS, from BRS, Inc. The data base is priced on an as-used basis and is also available to firms with internal data processing systems for about $5,000, the firm said from 620 S. Fifth St., Louisville, Ky. 40202.

Sharpe Gives Access To Eurocharts

TORONTO — I.P. Sharp Associates Ltd. announced that as a result of an agreement it has made with Eurocharts Ltd. the subscription fee and restricted access to the Eurocharts Commodities data base will be dropped immediately.

This means that any existing or potential users of this data base will be able to access the data on the I.P. Sharp time-sharing system without surcharge.

Data for the U.S. markets will be available a few hours after the markets have closed, the vendor said. In conjunction with the price drop, more timely data and additional markets such as Treasury bills and Treasury bonds will be added.

I.P. Sharpe Associates Ltd. is located at 145 King St. W., Toronto, Ont. M5H 1J8, Canada.

Perkin-Elmer Unveils Analysis Packages

NORWALK, Conn. — A Purity Analysis software package for its Computerized Thermal Analysis System and a DSC software package for the company's Thermal Analysis Data Station (Tads) were announced here by Perkin-Elmer Corp.

The Purity Analysis software is used with PE's Computerized Thermal Analysis System, which consists of the DSC-2C, Differential Scanning Calorimeter and Tads. It reportedly automates the technique.

The DSC software package is called the Partial Area Analysis Program. It includes such applications as solid fat index, peak search, polymer blend analysis, percent crystallinity, peak separation, total peak areas and percent solid curve, the vendor said.

The Purity Analysis software costs $1,500 and the Partial Area Analysis Program is priced at $3,500, the vendor said from its headquarters at Main Ave., Norwalk, Conn. 06856.

Software Designed For Welding Supply

CINCINNATI — Specialized software for welding supply distributors has been developed by Sentinel Computer Corp., supplier of turnkey minicomputer systems for the distribution industry.

The Rental/Demurrage and Cylinder Control System was written especially for welding supply distributors who deal in gases. The system closely interacts with Sentinel's order entry/invoicing, inventory control, accounts receivable and sales analysis systems that comprise part of a group of general accounting applications called Profit Control.

The software carries a one-time license fee of $2,500 from 9902 Carver Road, Cincinnati, Ohio 45242.

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What could draw representatives of such companies as AT&T, General Electric Co., NCR Corp., Sami, Tymshare, Inc., Sweda International, Inc., IBM and Honeywell, Inc. to Newark, N.J., on a sultry summer day?

The answer is a one-day seminar on computer-to-computer communications, with an emphasis on the Uniform Communication System (UCS) for the grocery industry.

The people who provide the nation with its food have seen the potential benefits of computer-to-computer communications and have undertaken a project, now in its pilot stage, to bring it to one of the country's largest industries. Realizing that UCS is on the threshold of reality, computer companies and service bureaus are educating themselves to the particular communications needs of this industry — as well as others with communications standards — and are preparing themselves for the many opportunities UCS can bring for computer equipment and services.

Included in the grocery industry are thousands of manufacturers and distributors (retailers) — large and small — across the country. They are often aided by hundreds of brokers and service bureaus. In order to remain competitive and provide the best in customer service, each company will probably have to tie into the UCS network. To do this, they may need new equipment, additional services and expert assistance. For this reason, leaders in the computer field flocked to the offices of Touche Ross & Co., which managed the development of standards for UCS.

What Is UCS?

UCS could replace the present manual and paper flows in the grocery industry with a computer-to-computer transmission of purchase orders, invoices, shipping and receiving advice, promotions and other messages. Currently a message — for example, a purchase order — must be manually key-entered into computers twice, once each at the distributor's and manufacturer's, and then a third time if a broker or service bureau is involved in the transaction.

However, under UCS the purchase order will be key-entered once only, by the distributor, and then will be transmitted electronically to the broker and manufacturer. The flow will be reversed for transmission of the invoice. One company's computer will place its messages in a "mailbox" until they are retrieved by the other company.

Grocery industry officials have been driven to UCS partly as a response to pressures besetting many businesses today. Among these pressures are declining productivity, rising inflation, increased competition and increased cost of capital. UCS is seen as a system that can impact a number of these problems.

There is the reduction in manual han-

(Continued on Page 50)

Honeywell Unveils Terminals For Ticket Reservation Systems

WALTHAM, Mass. — Honeywell, Inc. announced two microprocessor-based terminals to be used in airline reservation centers, airport and city ticket offices, and travel agencies.

The terminals are said to be compatible with the industry's airline reservation system (Pars). They are the Model 1510 standalone video display system and the Model 1530 large-cluster terminal processing unit.

The Model 1510 reportedly is user-programmable and offers up to 16K bytes of erasable programmable read-only memory (Eprom) and random-access memory (RAM). It comprises a 12-in. screen and keyboard.

The system can display up to 2,000 characters in four formats. It communicates with a host system for interactive, real-time inquiry/response transaction processing and can transfer data at rates up to 9,600 bit/sec in synchronous and asynchronous modes, the vendor said.

The Model 1530 terminal processing unit connects multiple terminals to a host computer. It reportedly supports up to 16 Honeywell VDU1501 video display terminals and communicates with a host system at speeds up to 9,600 bit/sec in synchronous or asynchronous modes.

An optional multiplexer controller is said to enable one modem to support two terminal processing units for connecting a maximum of 32 workstations. The unit is user-programmable and can have up to 64K bytes of Eprom and RAM addressable memory, depending upon the specific configuration, according to Honeywell.

The Model 1510 video display system, including 6K bytes of Eprom and 4K bytes of RAM, sells for $3,000 plus a monthly maintenance fee of $30. The Model 1530 terminal processing unit, with 8K bytes each of Eprom and RAM and one 8K byte memory-refresh board to support up to eight workstations, is priced at $6,245 plus a monthly maintenance fee of $33, Honeywell said.

Both are available for immediate delivery, Honeywell said from 200 Smith St., Waltham, Mass. 02154.

DEC Machines, Remote Terminals Tied

HOUSTON — A buffered program interface between Digital Equipment Corp. PDP-11 and VAX-11 computers and multiple local or remote asynchronous terminals is available from Computer Extension Systems, Inc.

Eight-line or 16-line versions of the SLZ 11 are available. The eight-line version reportedly consists of a single hex-wide control board, cable assembly and distribution panel. It may be expanded to 16 lines by adding a second control board and cable assembly, according to the vendor.

The 16-line version consists of two control boards, cable assemblies and distribution panel.

The 8-line unit costs $1,695, the 8-line add-on costs $1,190 and the 16-line unit, $2,650, Computer Extension said from 17511 El Camino Real, Houston, Texas 77058.

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Zentec Intelligent Terminal Based on Intel 8085

SANTA CLARA, Calif. — Zentec Corp. has announced the ZMS-35, an intelligent terminal based on the Intel Corp. 8085 microprocessor.

The unit features 16K bytes of random-access memory, a fully configurable keyboard and a 12-in. CRT terminal with a 128-char. set. It can be used for forms entry or stand-alone processing.

Interfaces include the RS-232C for operation at up to 9,600 bit/sec and 20mA current loop at speeds up to 19.2K bit/sec, the vendor said

Units cost from $1,350, the vendor said from 2400 Walsh Ave., Santa Clara, Calif. 95050.

Norand Has Transmission Family

CEDAR RAPIDS, Iowa — Norand Corp. has unveiled a family of acoustic couplers, modems, protocol converters and language translators that comprise a system for handling multiple and single data transmission between its 101XL remote data entry terminal and the 490/495 Norand receivers or other CPUs.

The system is designed for use in distribution industries such as snack food, baking, bottling and pharmaceutical. It allows for the consolidation of a large number of input terminals into s single host computer.

The devices permit half- and full-duplex transmission and allow communication to take place over regular telephone lines or through direct connection to a CPU.

The price range for the products is $135-$5,500, Norand said from 550 Second St., Cedar Rapids, Iowa 52401.

UCS Talk Draws Industry Eyes

(Continued from Page 49)

dling and keying; in addition, pricing and clerical errors may be reduced. Because of the speedier transmission, manufacturers and distributors may be able to reduce inventory levels. UCS could also improve internal systems and make sales calls more productive by allowing reps to spend less time on routine orders and more on promotions, problems and special needs.

Each of the segments in the industry will share some of the common benefits and reap a few exclusive to itself. A conservative estimate in annual savings for the entire industry, assuming 50% participation, is $300 million.

Implications for Vendors

UCS is expected to see widespread usage between 1985 and 1990, but first s number of problems must be dealt with. This is where the computer industry enters the scenario, helping to solve such problems as:

- Operational coordination of the communications.
- Transmission of a few messages per day, each to many companies.
- Conversion of data to and from standard formats.
- Provision of easy access to smaller users.
- Capability of companies to use multiple standards because of their dealing with a variety of industries.

To help companies address these problems, computer firms will have to furnish hardware, communications networks and software, as well as a variety of services. They will, for example, have to provide equipment for smaller companies with turnkey software. Larger companies will need dedicated equipment for communications control and coordination and a tape or transmission interface.

In terms of communications potential, vendors can help companies wrestle with the problems of network services for transmission, conversion between communications disciplines and communications assistance with the operation of computer-to-computer transmission.

Services that computer vendors will be called upon to provide deal with:

- Communications and the management of the communications.
- Communications with translation between internal formats and the standards.
- Soup-to-nuts service, including data entry via terminal or other device.
- Document broadcasting based on message content.
- Software packages for maintenance of tables, communications control and operation, translation between formats, error control and recording.
- Interim services to companies first beginning with computer-to-computer communication.

Requests for a copy of the UCS Draft Standards, which costs $25 each copy, should be made to the Transportation Data Coordinating Committee, Suite 708, 1101 19 St., N.W., Washington, D.C. 20036.

For those interested in obtaining more information about the status of computer-to-computer communications, more information is available from Touche Ross, Gateway 1, Newark, N.J. 07102.

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HAZELTINE	1420 CRT Terminal	945	91	51	34
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	1552 CRT Terminal	1,295	125	70	48
TELEVIDEO	920 CRT Terminal	995	48	48	42
	950 CRT Terminal	1,575	153	57	39
NEC SPINWRITER	Letter Quality 55 15 RO	2,695	278	154	104
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The Mini/Micro Computer Conference and Exposition has never aimed at sheer size and weight. The way we see it, enough is enough.

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The industry already has its monster event. Like the two-ton gorilla, NCC sleeps wherever it wants to, and when and how it wants to. In 1981, it chose Chicago.

Mini/Micro81 has chosen Anaheim. That makes us the only show-and-tell computer event in California this year.

We're not trying for Huge; we're trying for Good and Useful. We know we'll bring together a high-quality, professional audience of about 8000 — just as we have in Anaheim in each previous occasion.

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Mini/Micro81 will have a program of 15 expert half-day sessions — real-world presentations of ideas and opportunities, trends and applications.

We're not going to offer 100 sessions, and we won't welcome "Mathematical Modelling for the 21st Century."

We've added a first-day plenary session, featuring keynote remarks by Representative Barry Goldwater, Jr. — the tough-minded congressman from California's 27th district, who sits on the House Science and Technology Committee.

We've added daily User Feedback Forums, open to all — informal straight talk about day-to-day problems and solutions with a strong panel to arrive at some honest answers.

We've made arrangements for companies to present Vendor Seminars — system demos and technical how-to presentations.

Smack-dab in the middle of the action
We're putting all of this into one of the great arenas in the country, and right in the fast lane of California computer activity — the Los Angeles/Orange County/San Diego megalopolis.

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We take more Anaheim Convention Center space than we need — more than enough for thousands of guests to move through hundreds of product displays in three days without bumps and grinds and elbows in the ribs.

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We would realize a lot more income at 20,000 people, but then we would have a quality-control and crowded-aisle problem. NCC plays the big numbers game better than we care to.

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Terminal Uses Battery

The Battery-Operated Model 729 Terminal

ST. LOUIS — A portable, battery-operated terminal with 12 keys in standard Touch-Tone format for quick tone-dialing address to all types of tone response systems has been announced by Interface Technology, Inc.

The Model 729 can be acoustically coupled to any telephone handset for accessing or controlling dictation and word processing systems or computer aystems, the vendor said.

The 729 is priced at $49 from Interface Technology, Inc., 10500 Kahlmeyer Drive, St. Louis, Mo. 63132.

Joins DEC VT100 Line

VT125 Out for Business Graphics

The VT125 Video Terminal

MAYNARD, Mass. — A terminal with plotting and business graphics capabilities was unveiled here by Digital Equipment Corp.

The VT125, an extension of DEC's VT100 and VT105 video terminals, was designed for use in business, laboratory and scientific graphics applications.

The terminal reportedly can display pictures and shapes, plotted trend lines, bar charts, pie charts, point-plot graphs and continuous data plots. It incorporates a microprocessor that enables it to execute locally DEC's Remote Graphics Instruction Set (Regis), according to the vendor.

With Regis, pictorial data can be created and stored as simple Ascii text, according to DEC. Regis commands can be inserted in programs written in any programming language.

DEC also announced the availability of kits to upgrade a VT100 or VT105 terminal to a VT125 terminal. The kit to convert the VT100 terminal is the VT1XX-CB; the VT105 conversion kit is called the VT1XX-CL.

The VT125 terminal costs $3,800. The upgrade kits are priced at $2,000. Deliveries are scheduled for fall 1981, DEC said from its headquarters at 146 Main St., Maynard, Mass. 01754.

PTS-2000 Gets Desktop Printer

NORWOOD, Mass. — Raytheon Data Systems Co. announced the availability of its desktop screen printer for the PTS-2000 intelligent terminal system.

The R2185 reportedly provides 100 char./sec dot-matrix printing with 80 positions per line and six lines to the inch. Standard features include a pin-feed platen, a 96-char. Ascii set and a Mobius loop cartridge ribbon system.

Print Buffer

Raytheon offers an optional print buffer that it said allows normal use of the display during printing and an optional "host access" feature designed to allow printing of messages from the host computer, the company said.

The Model R2185 Screen Printer with its display adapter is priced at $1,910 with one-, two- and three-year lease rates of $97, $80 and $71 per month including maintenance.

The Print Buffer option adds $120 and the Host Access option adds $235 to the purchase price, the vendor said from 1415 Boston-Providence Tnpk., Norwood, Mass. 02062.

LSI Users Get Slave For Protocols

PORTLAND, Ore. — A Digital Equipment Corp. LSI-11-compatible slave computer, configured for implementation of complex serial communications protocols, has been introduced by Nortek, Inc.

The PCP-11E includes a 4M Hz Z80 microcomputer and a dual-width card featuring 16K bytes of random-access memory (RAM), provision for up to 24K bytes of erasable programmable read-only memory (Eprom), an RS-232 serial channel and a 16-bit programmed I/O interface to the host Q-bus processor, the vendor said.

The slave provides communications augmentation capability to LSI-11-based systems and reduces host memory demands by off-loading management and data buffering functions for complex protocols.

The PCP-11E is priced at $995 from Norek, Inc., 2432 N.W. Johnson St., Portland, Ore. 97210.

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Putting MANAGEMENT Back Into MIS

By B.K. Mehra

Current literature related to technological developments in the information processing industry is pointing to yet another evolution, office automation. It is the total integration of data processing, word processing, communications and advanced sophisticated applications.

Undoubtedly, equipment manufacturers and information systems specialists will take us there one of these days. However, senior management must understand fully all of the ramifications and support resources requirements (particularly that of qualified personnel) prior to plunging into another "black-box" era.

On one end of the spectrum, we have office automation; on the other, organizations in which computers are not being used effectively. Explosive growth in the use of computers has affected almost every business environment. Like any other technological development, as long as it is carefully monitored, controlled, managed and used in an appropriate manner, computers should be beneficial to any business organization. Therefore, it is essential that a business executive understand how management information systems (MIS) functions should be managed.

Senior management must treat the MIS department like any other functional group and apply all the management principles applicable to a service group. MIS groups exist in an organization to provide services to different functional groups, to generate consolidated information systems to satisfy corporate needs and to assist group executives in the decision-making process. No system or activity should be performed unless it is going to assist a department (including MIS), a group or an executive in the management of their respective functions.

It is natural for a business manager to ask, "Why are we producing Product A if there is no demand for it in the foreseeable future?" Yet, the same question is rarely asked about MIS-related activities. Let us say that an MIS budget is $3 million annually. I wonder how many executives ask, "Are we getting benefits worth $3 million annually from the services of the MIS group?"

Undoubtedly, there are in the computer field professional managers who are doing an excellent job of managing MIS functions and of keeping senior executives well informed and educated in computer-related activities. There are also others who have somehow reached managerial positions and are successfully keeping senior management in the dark with respect to the techniques of managing MIS functions.

Obviously, these latter managers will continue to operate in their style so long as they are not challenged. It is ironic that intelligent, experienced individuals holding senior executive-level positions fail to ask the right questions about MIS. Is it because they do not want to be bothered with MIS activities because they really do not understand them? Is it because MIS activities have a very low priority in their minds? Is it because MIS management has done a good sales job and has kept senior executives completedly satisfied (or confused)?

Whatever the reason, both MIS management and senior executives are sooner or later likely to face reality and to begin to manage MIS functions professionally.

In any organization, information systems should be designed to support business activities rather than to fulfill the needs of individuals, because in our mobile society personnel changes are more frequent than changes in business activities. At times, it may be politically better to satisfy individual needs to achieve overall business needs. The success of a business will depend upon how fast management can react to the dynamic and ever-changing business environment.

The effectiveness of management's decisions will depend upon the quality of information available. Senior executives use information from different sources and, in some cases, the intervening processing steps are extremely important, particularly when input data is supplied by different functional groups.

Development of integrated information systems (IIS) would enhance the decision-making capabilities of senior management. Data base techniques are available to achieve these objectives. An attempt should be made to have as few data bases as possible cover complete company data. Figure 1 shows the different relationships in a true MIS environment.

In any case, an IIS plan

(Continued on In Depth/3)

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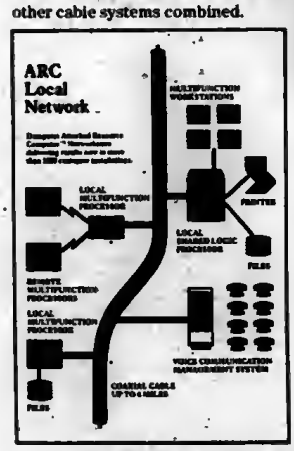

ARC networks enable workstations, processors, printers, and files to be linked together so that all resources are available to all users. Shared access brings significant economies while uniting all members of an organization with a high-speed artery for information exchange.

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Vic Poor is Executive Vice President of Research and Development at Datapoint. He pioneered dispersed data processing, designed the first computer-on-a-chip, and developed ARC™ —the most widely used coaxial network for linking business machines.

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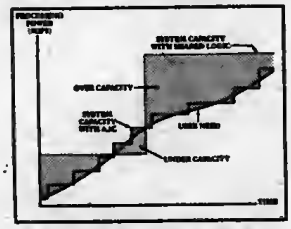

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PUTTING MANAGEMENT BACK INTO MIS

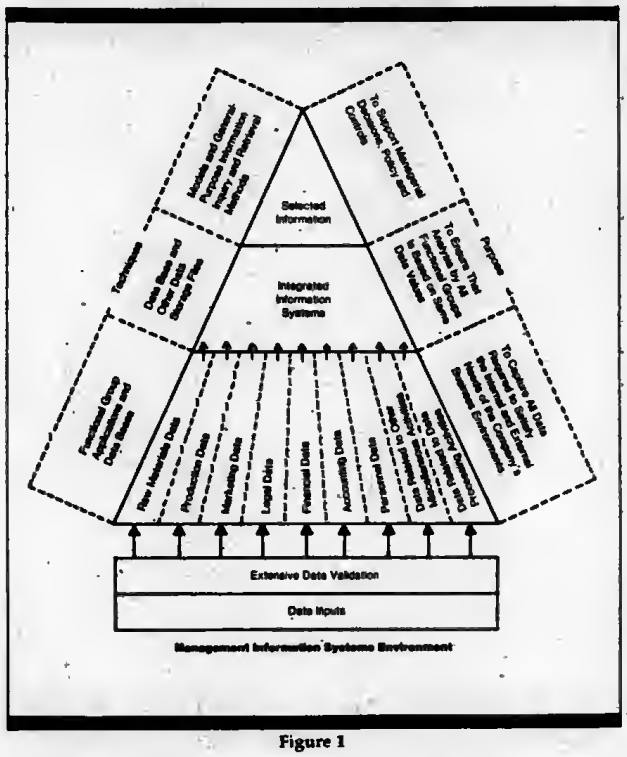

Figure 1

(Continued from In Depth/1)

should be thoroughly thought out and developed by utilizing the expertise of different disciplines in the organization. The plan should facilitate a time-phased modular approach to implementation, thereby letting the user group and management feel confident each module will fit and function properly in an integrated environment. Optimom utilization of resources, both equipment and personnel, is a key to increased profitability.

Development of IIS would result in an efficient and effective utilization of systems development resources. It is in the interest of senior management to support this activity in the organization and to commit necessary development resources. The resources assigned to the design and implementation of the IIS must be of top quality, not trainees, in both user groups and MIS group.

Information systems integration requires the cooperation of all functional groups. Organizationally, it will work better if the MIS group reports directly to the highest management level. The individual heading the MIS group should be on the same level as other functional group heads. This equality will permit proper utilization of MIS resources and provide a mechanism to allow free interaction with other groups and to counteract the bias of any other functional group.

A strong management team is essential for the continued success of a business. The MIS group head should be treated as a member of the senior management team and must be a professional business manager first and a data processor second.

IIS should be developed under the guidance of a competent MIS manager. How can senior management decide whether an MIS manager is competent? Generally speaking, the desirable characteristics of an MIS manager are no different from the characteristics of other business managers.

An MIS manager should have knowledge of company business besides other management and technical skills, namely:

- The ability to effectively communicate internally and externally.
- The ability to maintain good interpersonal relationships with top management, other department managers and subordinates.
- A knowledge of organizational development principles.
- Innovation and entrepreneurial skills.
- Project management know-how.
- The ability to design and implement IIS.
- A knowledge of computers and data communication technology.

If these characteristics had to be ranked in order of importance, I believe most professional managers would not change the sequence significantly. Notice "knowledge of computers" is last. This does not imply that an MIS manager need not know computer discipline; it simply indicates that technical skills, although essential, must not be given undue weight.

MIS Environment

Why do some MIS groups enjoy the full support and confidence of senior management, while other MIS groups are complete disasters? It is pitiful that an extremely powerful tool — the computer — is not being fully and properly utilized in some business organizations, partially because of the lack of interest and understanding at the senior management level and partially because of ill-qualified individuals managing MIS functions.

Senior management generally claims it has delegated the responsibility of managing department functions to the respective group heads. There is nothing wrong with this management philosophy. Freedom

(Continued on In Depth/6)

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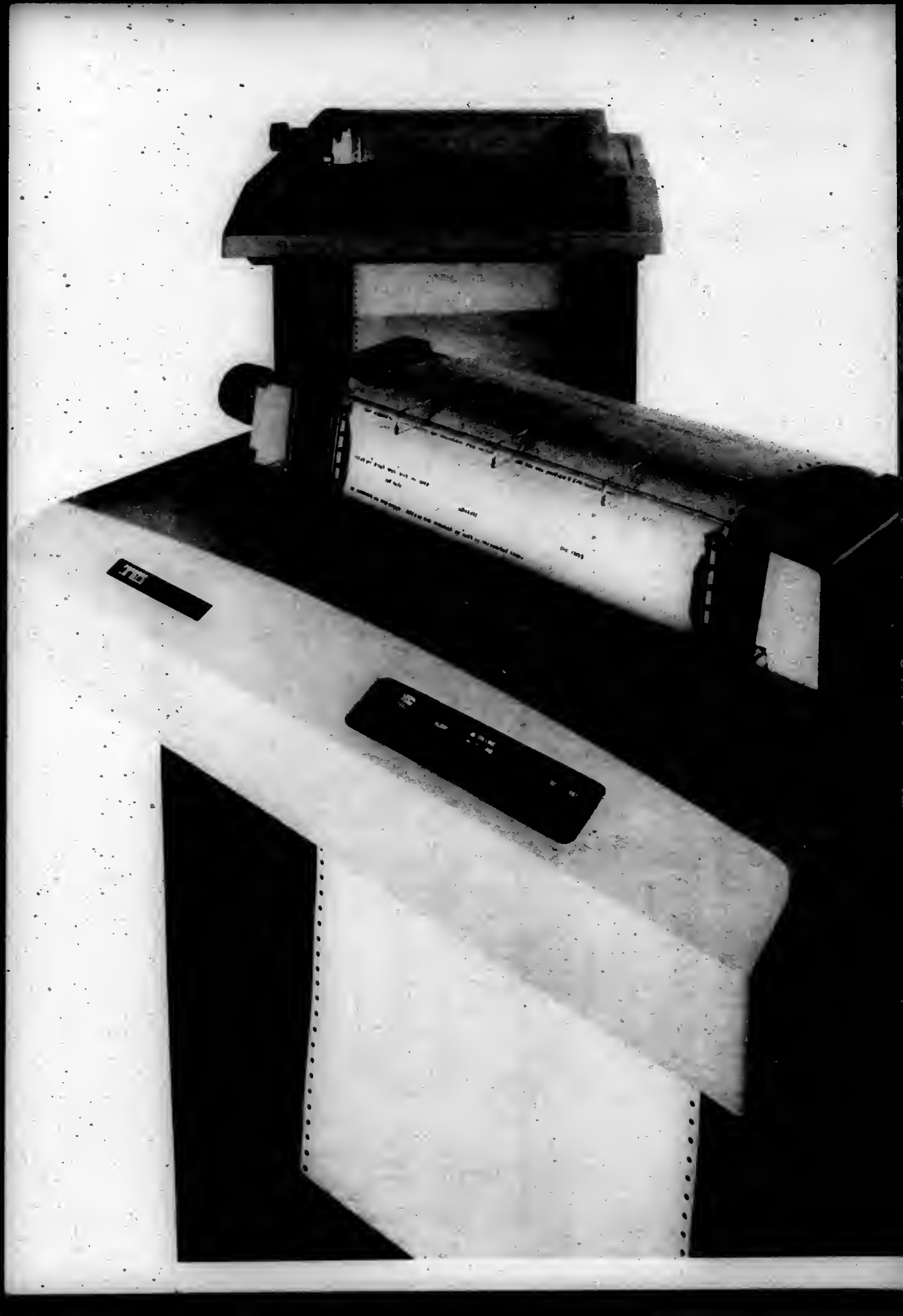

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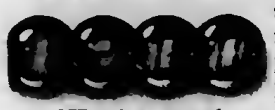

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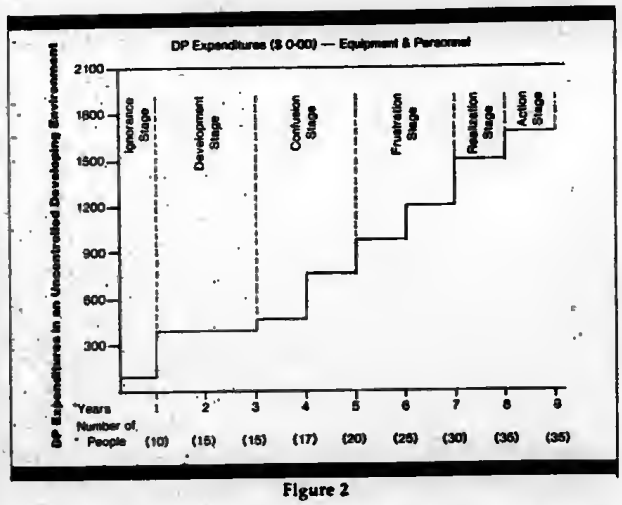

Figure 2

(Continued from In Depth/3)

of action and delegation of responsibilities are necessary if an individual is going to be held accountable for a function. Nevertheless, it does not mean the actions of a group need not be questioned or scrutinized.

Senior management can delegate, but it cannot abdicate its responsibility to ensure progress is being made in the right direction. It is possible an MIS manager may not have the power and/or skills to introduce the organizational changes required to provide proper services on a companywide basis. Senior management can prevent future disappointments by carefully auditing details as early as possible and by redirecting the MIS manager whenever necessary.

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It is debatable how MIS management should respond to situations like the following:

- When a user group requests that a certain function be computerized, should the MIS group blindly follow the instructions or recommend better alternatives, if any?
- If multiple functional areas are being serviced by MIS and the total number of activities requested by the user groups exceeds what the existing resources can handle, should MIS management add to its staff rather than face user management's complaints of the MIS group's inaction or lack of support?
- When a user group requests the installation of a terminal for convenience, should the MIS group ask for a justification based on the expected usage level or should it comply with the request?

The answers to these questions and others like them are dependent upon how senior management perceives the role of the MIS group and rewards the functional groups in the organization. If it is primarily based on the amount of budget controlled and the number of personnel in the group, management can rest assured that even a professional manager is likely to be swayed toward personal benefits rather than toward an efficient operation. Senior management is giving an erroneous signal if such is the case. Therefore, MIS management should not be blamed for building an empire.

A prudent manager will adopt the expansion path as long as senior management will allow. Maximization of profits or resources utilization is very much related to the organizational environment. It is no secret that many organizations do not maximize profits for the shareholders. Generally, the policy is "satisfying" the shareholders and maximizing personal gains.

Development, growth and satisfaction of individuals should have a beneficial effect on organizational growth. Realistically speaking, it is probably the best long-range strategy for an organization for dealing with the complexities of human behavior and organizational environments.

In any case, if senior management is expecting an efficient operation in the MIS group, the reward system must explicitly reflect this operating philosophy. If MIS activities are not controlled, the scenario illustrated in Figure 3 is likely to occur, particularly when the MIS functions are not being managed by a professional business manager. Figure 2 shows the likely DP expenditures in a small-to-medium-size organization throughout the six stages outlined in Figure 3.

It is obvious the MIS group would not have survived, as outlined in Figure 3, if some useful computer applications had not been developed to

STAGES	ACTION BY DATA PROCESSING GROUP	SENIOR MANAGEMENT'S REACTION
1. Ignorance (First Year)	* DP group overwhelms the executives with technical jargon and capabilities of computers. * DP group installs the computer and peripheral equipment with or without any long-term plan. They ask the executives to "trust" their judgment.	* The executives give the DP group a budget and allow them to do whatever they want. No attempt is made to understand DP functions in detail. * Executives consider these as essential tools to perform DP functions and do not relate these to the overall company needs.
2. Development (Second and Third Year)	* New computer programs are written quickly to demonstrate DP expertise. Some useful applications are developed. * Proposals to increase equipment and staff are submitted.	* Results-oriented executives feel that it was a good move. * Executives trust the DP group judgment and approve the proposed plans.
3. Confusion	* Work continues using individuals with programming skills but little system or business know-how. Problems in the operating groups are exaggerated by DP personnel without full appreciation of the requirements in the real world. * DP management displays DP effort in the form of number of programs written, files processed, requests handled, reports generated, lines printed, etc. Existing equipment is filled to capacity without any attempt to assess the value of processed information. Efficiency and effectiveness of operations are ignored.	* Executives begin to hear user group complaints, but consider these as the "usual resistance to change" and ignore these. * Executives are becoming confused. DP group is telling them how fine a job they are doing, whereas user groups are complaining loudly and are reluctant to use DP group services.
4. Frustration (Sixth and Seventh Year)	* DP management comes up with another plan for increased budgets based on their way of operating requesting more manpower and equipment. * Justification of plans is presented based on the numbers in the technical areas with very little relationship to the overall company growth plan. * With the increased budgets and more activities, user groups get more alienated because DP group continues "minding everyone else's business except theirs." Even the computer systems-related issues are attributed as "user problems," creating the impression that DP group is never wrong or in error. * Technical innovations and new processing techniques that seem oversold to the management are not backed up by the results achieved by the DP group. Communication with the user groups breaks down. DP group starts complaining that no progress can be made as user cooperation is not there, even though DP group has fully cooperated. * DP group tries to formulate the methods that should be used and the requirements from the user groups to develop integrated information systems.	* Executives realize that with the increased work load budgets will have to be increased, but are not sure; therefore, ask for justification of proposed expansion plans. * Executives do not understand all of the terms or how DP functions can be really managed. Reluctantly, increased expenditures are approved. * Executives, once again, hear complaints from the user groups, but take no action. User groups start discontinuing the use of DP group services. They begin to keep manual controls to verify validity of reports from the DP group. Executives are confused, frustrated, and fail to understand why DP group is not operating properly. * Executives feel more frustrated and in order to save themselves some time, form a committee with use representatives from each functional group, i.e. involve a few more people to resolve the conflicts between the DP group and rest of the organization. * It is soon recognized that converting user groups' alienation to confidence in DP activities will require proper controls on the DP group and educating user groups regarding computer usage.
5. Realization (Eighth Year)	ACTION BY DATA PROCESSING GROUP * For the first time, DP group has to face this challenge. Reluctantly and privately they admit to their lack of expertise and the quality of available staff. * DP group agrees to comply with the mechanisms approved by the committee.	SENIOR MANAGEMENT'S REACTION * Some executives begin to see the need to apply professional management techniques and closely monitor DP activities. * User groups are skeptical but begin to use DP group services cautiously and reluctantly in the hope of salvaging the situation. * Senior management can either: 3 Once again hope that the DP group will perform satisfactorily and will be able to develop meaningful information systems. Or 4 Based on an objective critical independent evaluation of the group, make the necessary changes in the management or staff to take care of the overall company information needs in an acceptable manner.
6. Action (Ninth Year)	* DP group begins to react. In order to improve their image in the organization, they once again adopt the base way they know, i.e. give users what they want with quickly written isolated programs or applications.	

Figure 3

the satisfaction of user groups. The issue is not what MIS has accomplished, but what it has cost or is costing the organization compared with the benefits derived from these accomplishments.

It should not be implied that all user groups will always be satisfied with MIS services. Some individuals tend to criticize MIS activities without an understanding of computers and systems discipline; other knowledgeable individuals or groups will have meaningful criticisms that must not be ignored.

Corrective action needs to be taken as soon as possible. The corrective action can range from a change in the management of the MIS group to simply asking the existing management to perform in a businesslike manner.

No one other than senior management is likely to be successful in bringing out this change. Senior management should treat the MIS group like any other business unit and MIS management should not be used as a scapegoat for all existing problems.

If senior management has gone through the developmental stages of the MIS group outlined in Figures 2 and 3, it should be prepared to share the responsibility for the MIS environment existing at any given point in time. Any undesirable situation can be averted by senior management's real participation in the developmental process rather than by ignoring the issue of managing MIS functions.

It should not take senior management eight or nine years to realize what should have been done in the first place — hiring a professional, business-oriented manager who can work with all levels of management, resolve the user problems on his own, understand decision making and systematized problem-solving techniques and manage the DP functions efficiently in a cost-effective manner, which is well understood by the different user groups. A technical giant or a superprogrammer will not be able to cope with the job requirements.

In a controlled MIS environment, the caliber of staff and services is likely to be of a high quality and satisfactory to a majority of the user groups. With senior management's participation and a better understanding of MIS functions, it is possible to avert the Confusion, Frustration, Realization and Action Stages. Instead, there can be one ongoing, professionally oriented, efficient, cost-effective environment that can be called the "Enhancement Stage."

Rather than resolve conflicts between MIS and the user groups, senior management can then take advantage of new technological developments to satisfy the business needs, instead of the DP group's needs. If senior management is not willing to monitor the MIS activities, it is likely to find — in addition to excessive annual operating costs — that the MIS group will be staffed by individuals lacking in business sense and appreciation of the intricacies of the decision-making process in the different disciplines of the business environment.

It must not be concluded that technically competent individuals cannot become good managers. Given opportunity and understanding, many technically oriented individuals can learn the principles of management and can maintain the reqired balance between technical and managerial skills. As is true in many other operational groups, management of MIS activities is an art and a science.

The reporting relationship of MIS in an organization can significantly affect the overall environment. To achieve cooperation of all groups and to integrate company information needs, it is best if the MIS group head reports, like the heads of other operational groups, to the president of the company, particularly in a small-to-medium-size organization.

(Continued on In Depth/8)

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IN DEPTH

(Continued from In Depth/7)

Planning, organizing, staffing, delegating and controlling are the typical management tasks with which senior executives are quite familiar. This framework is equally applicable to MIS functions. Senior management can understand and manage MIS functions by asking appropriate questions in these areas. Dramatic, significant improvements are likely to result by simply using the word "Why?" as many times as necessary for an executive to have a better understanding of why certain activities are being performed.

Simple questions like the following should be asked not only to understand and evaluate MIS group activities, but to develop a feeling of accountability in the minds of MIS management:

- What are the strengths and weaknesses of the MIS group as perceived individually and collectively both by user management and its staff and by MIS management and key staff members within MIS?
- How do the user groups rate MIS group services? (Specific examples of areas of dissatisfaction, if any, must be identified.)
- How is the MIS group organized to provide support to the different functional user groups in the company and the functions within the MIS group? What are the pros and cons of the current organizational structure? Will a different organizational structure be required during the next three to five years? Why?
- What are the short-range (one year) and long-range (three to five years) development plans of the MIS group in relation to the personnel and equipment requirements? How are these related to company objectives and goals?
- What is the current and future work load by project and by user department indicating labor months required to complete each project? Why are these projects scheduled to be developed and what is their justification?
- How are the overall MIS efforts actually spent in the different activities; namely, overall management, new user applications development, maintenance of existing user applications, technical improvements generated by MIS, evaluation of new hardware and software and normal processing operations? (This should be in labor months and dollars rather than percentages, which alone can be misleading if the basis is not known.)
- What mechanism exists to ensure a proper systems approach is being used to develop and document applications to satisfy the needs of the user groups? How is it monitored? (A systems approach should cover applications development mechanism, user approvals, accuracy and security of data files, identification of interface requirements between different applicationsand so on.)
- Is the computer and peripheral equipment being used efficiently and effectively? How is the efficiency and effectiveness measured? What is the utilization level for each main equipment category?
- What is the cost of providing services (separately identifying all significant segments of processing cost by job) to the different user groups on a monthly basis? Are these competitive with other available alternatives?

In addition to the above-mentioned list of preliminary questions, a series of follow-up questions must be asked by individuals knowledgeable in the use and management of computers to determine the exact status in each of the areas. It is difficult to identify follow-up questions for each possible scenario. Based on senior management's operating style and collective or individual experience with com-

(Continued on In Depth/13)

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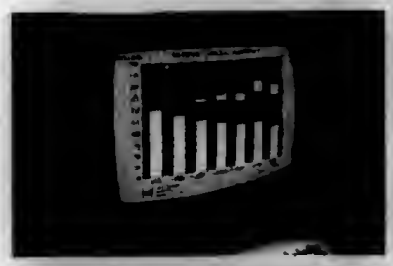

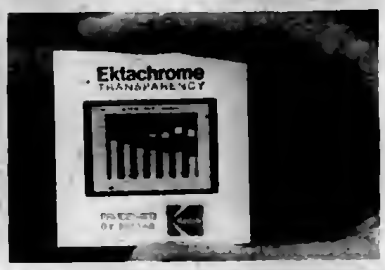

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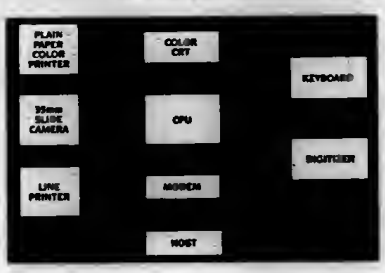

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(Continued from In Depth/8)

puters and information systems, the necessary questions can be asked to gather appropriate information and to understand MIS functions and systems discipline.

In any case, the answers to these questions will give any executive sufficient information to understand and gain insight into the management of MIS functions. Also, this approach would enable senior management to assess whether the MIS group is being managed by a professional business manager.

Summary

An inefficient and detrimental organizational environment can be avoided only if senior management will listen to the warning signals and take appropriate action.

Weeding out the emotional and superfluous opinions is not easy in many cases. Decisions in an organization are going to be tempered by a number of factors, specifically, reward system mechanism — which means it is based on gut feelings, "buddy-buddy" attitude or actual performance levels; personal associations within the framework of the company's political arena; attitude of senior management; understanding of computers and systems discipline at the executive levels; size and extent of MIS activities; caliber of MIS management and staff; and sophistication and attitude of user groups.

Generally, the organizational reward systems (pay scales and other prerequisites included) take good care of managers who control a large budget, but penalize those individuals who are efficient, conscientious and who work with a limited staff — particularly in the highly technical areas.

Both technically oriented and management-oriented individuals are required in any organization. Technically oriented personnel should be allowed to work in their respective areas of expertise at competitive salaries rather than being forced to become managers, possibly resulting in a chaotic situation. MIS groups are no exception to these general statements.

Senior management should not be overwhelmed by the number of programs written or lines printed by the MIS group. It is the value of information generated by MIS in relation to the costs incurred that needs to be evaluated. Quality of information, rather than quantity, should be rewarded. Senior management should not reward the MIS group (or any other functional group in the company) solely on the basis of budgeted dollars controlled or number of employees in the group, but on the value of their function in the organization and the efficiency with which these functions are performed.

About the Author

Basant K. Mehra is president of MPB Enterprises, Inc., Wheat Ridge, Colo., a management consulting firm specializing in business problems analysis, systems planning and evaluation, applications development and educatinal seminars. Mehra holds a Master's degree in engineering, as well as an MBA, and has practiced his business in both the U.S. and Canada.

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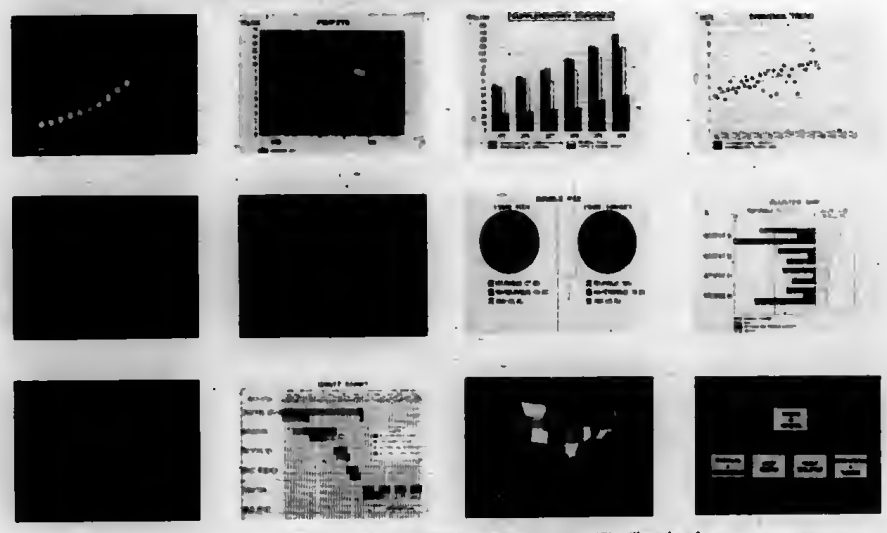

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WALKTHROUGHS & REVIEWS

What, Why, When, How

By H.R. Sides

Having a walkthrough or review means simply that two or more people get together and agree on the validity of a proposed solution to a problem. The degree of formality varies.

At their most informal, these get-togethers are called "bull sessions." More specifically, a review implies there is someone present with the authority to arbitrarily define good and bad — to accept or reject what is being reviewed.

A walkthrough, on the other hand, means an interchange of ideas and suggestions, where the person presenting the material has the final decision-making responsibility. In the real world, however, what you have and what you call it will depend on the formality of your organization, and your boss's preferences in terminology.

In this article, we will look at the purpose and types of walkthroughs and reviews and who should be involved. We will then look at some basic ground rules that should apply

Why Walkthroughs?

The basic purpose of a walkthrough or review is to ensure the implemented system, program or module will:

- Solve the stated problem with the desired degree of accuracy and efficiency.
- Meet the organization's standards.
- Be maintainable.

There is a general consensus among pundits that walkthroughs and reviews are productivity aids that can:

- Enable us to implement a larger percentage of our systems on time and within budget.
- Yield systems requiring little or no postimplementation fire fighting.
- Allow us to make postimplementation enhancements more easily and at a lower cost.

Solving the wrong problem, being accurate to the penny when thousands of dollars is close enough, designing a real-time system for data submitted weekly and reviewed monthly, designing a system or program that can be modified only by someone with a high tolerance for pain, failing to meet standards and obvious coding mistakes in a module are examples of things that should be caught by a well-conducted walkthrough. A review can also be expected to catch most of these problems, but it is primarily designed to ensure a correct solution and adherence to standards.

It is less painful to discover a potential conflict with the organization's standards (if there are any) during a walkthrough than after the fact, when your beautiful 50-page document comes back with a big red "FAILS TO MEET STANDARDS" stamped across it.

Maintainability implies flexibility, adaptability, clarity and the hope someone other than the genius who wrote it will be able to modify it.

Some by-products of walkthroughs and code reviews include more accurate results with less time spent testing and debugging, more modifiable systems and programs, more open lines of communication and a more frequent interchange of ideas. Most of these benefits stem from the answer to a simple question: If someone is going to look at your work, do you want to look like a hero or a klutz?

The majority of the problems that used to surface during testing or (horrors!) later should be found during the walkthroughs. At least one company has estimated that a change that costs $1 to make at design time will cost $400 to make after implementation.

As people are thrown in contact through walkthroughs, they will get to know each other better and may actually talk to each other from time to time outside of the formal setting. There is, of course, the other side of the coin: If a walkthrough or review is not conducted properly, tempers may flare. This will drive people into their holes.

As programmers and analysts become used to discussing their ideas — even bad ones — with others in walkthroughs, they may become more inclined to seek others' opinions on an informal basis. They may, of course, also become more inclined to tell the world when they think they have found the solution to a particularly pesky problem. If you're part of "the world," you may not consider this a benefit.

Believe it or not, the person working on a manufacturing system may get a good idea from a colleague who lives and breathes marketing systems. Anything that helps this type of cross-fertilization is not to be sneezed at.

(Continued on In Depth/18)

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(Continued from In Depth/15)

By now, we should all be convinced two — or more — heads are better than one. Anyone who has ever been part of a committee can tell you the approximate upper limit of "or more."

When to Implement?

There are, in fact, several types of walkthroughs or reviews. These can be held at various points in the system development cycle. Five are listed below, defined by their subject matter. You may think of others or feel only some need to be implemented.

1. System Design: Walkthrougha, one would hope, lessen the risk of ending up with a white elephant. Because users should be involved heavily in the system design, it would seem to follow they should be involved in walkthroughs. There is, of course, the minor problem that the manager who can tell an analyst or programmer "you *will* participate!" does not have the same leverage with the user. Gentle persuasion is called for.

The people who will run the system should be consulted at this point. Their ability to run the system and its impact on your resources should be considered before you charge ahead.

A review of the formal system design should be conducted. There may be two — one internal, and one with the user or customer. In any event, this is where you get the OK to do it!

2. System Test Plan: If you don't, you should. If you won't, skip to the next heading. A good test plan can be as complicated and error-prone as any system design or program. Therefore, walkthrougha should bring the same benefits in this area as in the other, more traditional areas.

Because a successful system test supposedly proves the system does, in fact, solve the user's problem, there should be user involvement in the plan design and a final review with the user or customer. The sample problem of lack of means of enforcement mentioned under System Design applies here. Also, the prudent manager may want to conduct an internal review before going public.

The people who will maintain the system should be consulted at this point. They will, after all, test their changes using your test plan.

3. Program or Module Design: Evaluating the need for a walkthrough at this level is highly subjective. It would seem that a formatted dump of a sequential file is a less likely candidate than a function that relieves inventory, cuts shipping papers and updates open order data. A complicated program with many modules or one or more complex modules may be a candidate for both program and module walkthrougha. Prudence suggests the designer of the program or module is not the proper person to decide a walkthrough is not necessary. In any case, some second opinion is desirable.

The people who will maintain the system definitely should be involved here. It is they who will have to unravel your wondrous design after you let go of the system.

As mentioned earlier, a walkthrough at this point should uncover any lack of compliance with your organization's program design standards. If such standards exist, then a review may be necessary to ensure their enforcement.

4. Completed Code: After a clean compile and before testing is a good time for a final walkthrough if the person who wrote the code is a novice (this includes an old-timer who is using a new technique, language or package for the first time) or if that person is basically insecure. After you have determined the actual code matches the module design, you're left with nit-picking and trifling details. This is the last chance for those who will maintain your code to get you on the right track. It is their next-to-last chance to get in their two cents.

There should be no need for a review at this point.

5. Production Acceptance: Now it's time to turn your baby into a real live production system or program. No more Mr. Nice-Guy. It's pass-or-fail time. It is to be hoped you and the user or customer have agreed everything is fine. What about the people who will run the system? What about those who will maintain it?

Naturally, both groups should have been involved from the beginning, but this is their chance for a final review to put their seal of approval on your work. Of course, if you haven't had them involved all along, they may turn thumbs down.

Next Step

Now that we have agreed on the difference between a walkthrough and a review and have some ideas as to when they are appropriate, we are left with the questions of who should be involved and what the ground rules should be. Let's confine ourselves to formal walkthrougha and review — those for which there is something written (possibly even signed) to document their existence. Let us further limit ourselves to general ground rules rather than carved-in-stone laws that must never be violated.

The key points to keep in mind for anyone conducting a walkthrough are:

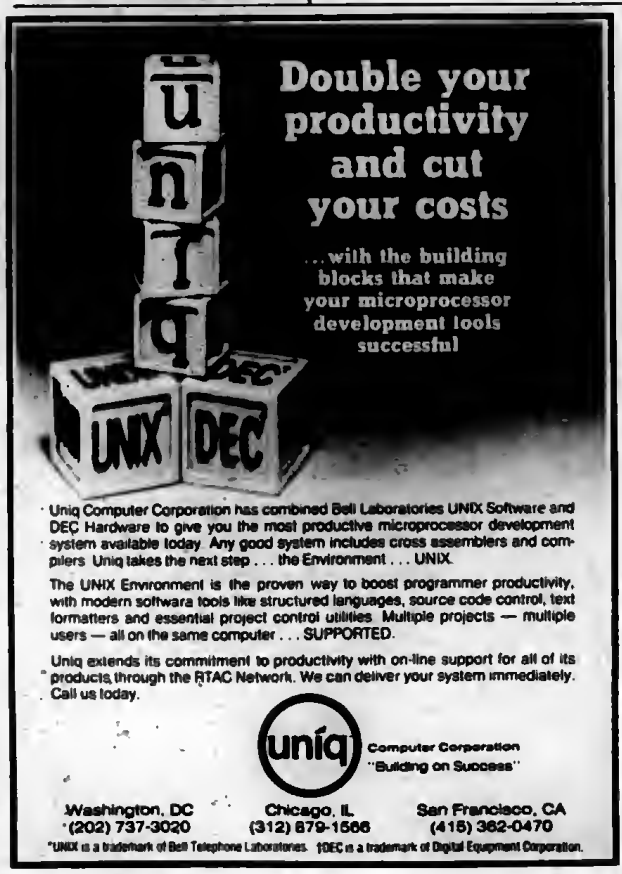
- The purpose of a walkthrough is to spot potential problems, not to solve them.
- Two heads are better than one, but too many cooks spoil the broth.
- Friends work better than enemies.

If you keep these three ideas and their implications firmly in mind, you should have no problem with walkthrougha.

The guidelines discussed here should apply to reviews as well as walkthrougha, but, in the real world, the person conducting the review ("authority to arbitrarily define good and bad") will define his or her own ground rules. Whether you like it or not.

Two people can conduct a walkthrough (or review). This can serve to give guidance and support, but se-

(Continued on In Depth/20)



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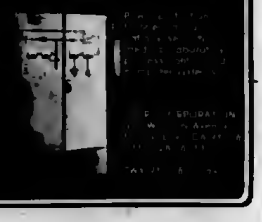

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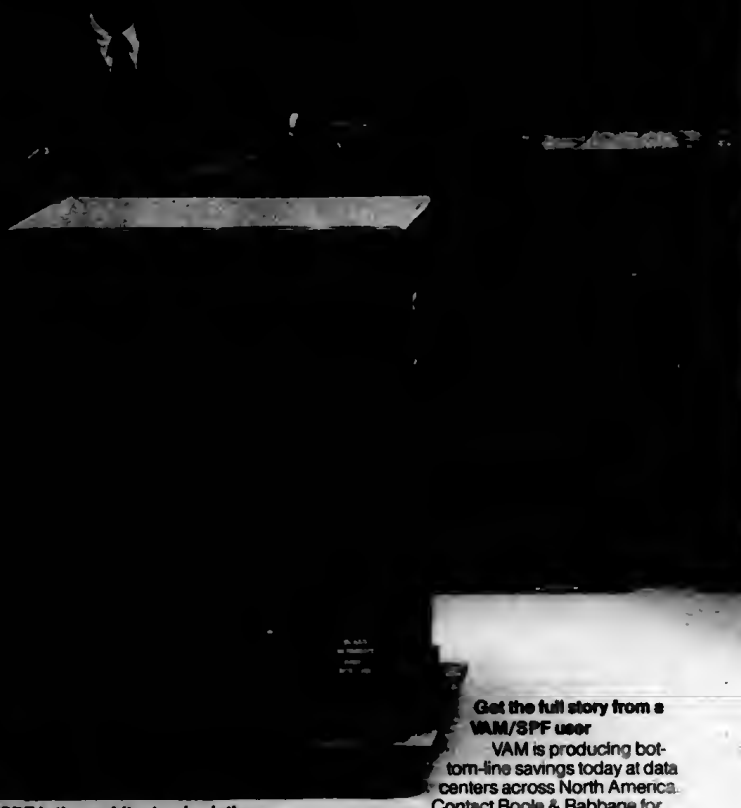

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IN DEPTH

(Continued from In Depth/18)

verely limits the potential for new ideas. It does not seem unreasonable or impractical to suggest that four people sit down together for a walkthrough, but if more than six are involved, you may end up with the proverbial horse designed by a committee (a camel). If more than two people are involved, you need a moderator. This person's job is to see that the discussion does not devolve into personalities or preferences in coding style or otherwise stray from the purpose of the discussion.

Although walkthroughs are often defined as applying only to peers, the inclusion of someone with more skill or experience can add a very beneficial learning component. Having a recognized "heavy" present, who can be expected to spot potential problems by virtue of past knowledge or experience, can be valuable. Also, it may be helpful to include someone who has nothing to do with the project and no background in the type of system being discussed. Such a person can act as a barometer for the clarity of the material being presented. This is also an excellent way to introduce fresh viewpoints.

Management should not participate in a walkthrough. But, if they insist, then they must not play favorites — everyone must be subjected to their presence. In fact, management participation automatically transforms a walkthrough into a review.

Since we are talking about formal walkthroughs, a list of the points to be covered should be prepared in advance. That and copies of any material to be discussed should be given to all participants with enough lead-time to allow them to digest the material before the meeting. Naturally, all participants should expend some effort preparing themselves for the meeting.

A list of all the questions raised during the meeting should be prepared. The person whose work is being discussed should reply to each question in writing and send a copy of the questions and answers, or solutions, to each participant. Remember — questions are raised during the walkthrough; answers are found later. Open questions may require further walkthroughs.

The only permanent record should define what topic was covered, when and by whom. Notes about questions raised and their answers are only short-lived working documents for the person whose work was discussed. However, if something has had walkthroughs and then falls flat on its figurative face in a review, management may want to plan special education or training for those who participated in the walkthroughs. A "What, When, Who" record can be helpful in this regard.

Sharing the Burden

All participants should share the burden for the correctness of the system or program. This is especially true if a team approach is used, but it also applies in other cases. If it is necessary to bring this home forcefully.

It seems that one-half to one hour is the appropriate duration of a walkthrough. If it lasts much less than a half-hour, you may not really have anything to discuss. If it lasts much longer than an hour, you may be trying to cover too much. Or you may be in trouble.

Evaluation should never be associated with a walkthrough. Cooperation, yes. Managers and supervisors, like teachers, can use the walkthrough technique as an aid in training and assessing the strengths and weaknesses of a subordinate. However, this does imply evaluation. If the manager doesn't realize this, the subordinate does! Let's call such sessions one-on-ones (or reviews) and leave the pros and cons for writers on effective management to ponder.

Finally, we have not mentioned those sessions in which we discuss alternative approaches and strategies. Such discussions do take place and are valuable. It is to be hoped that walkthroughs and reviews will foster an atmosphere conducive to this type of informal thought sharing.

About the Author

H.R. Sides is a senior systems analyst at Harris Semiconductor in Melbourne, Fla.

I/O

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NEA Survives Sink-or-Swim Situation

WASHINGTON, D.C. — It was an old story to those familiar with computers and their capabilities. To the DP staff at the National Education Association (NEA) here, however, it was a sink-or-swim situation.

After years of service and continually mounting computing pressures, the NEA's IBM-based computer system had just about reached the end of its processing limits. The system — which consisted of an IBM 370/155 processor, a number of IBM 3420 tape drives and a combination of Memorex Corp. 100M- and 200M-byte disk drives — could not adequately service the association's more than 1.7 million members.

For instance, the overworked system could process only two or three jobs concurrently, which resulted in a number of job bottlenecks. In addition, since the computer operated with a continental dial-up communications system and operated under Turnkey Systems, Inc.'s Task/Master software system, it did not offer interactive and remote job entry capabilities and was limited to serving about 22 of the 50 U.S. states.

"Conversion to high-speed tape drives has greatly enhanced the center's dump/restore operations," Mike Putro, DP director for the NEA, reported.

Low Performance

"Performance was continually falling below acceptable levels," according to Mike Putro, the present director of NEA data processing, who joined the organization early last year.

"Since there was no way to meet anticipated growth in service demands with the existing system, a lot of things needed to be done all at once."

These "things" included upgrading the entire DP system, including the construction of a larger computer facility here. The organization also added a second CPU, an IBM 4341; upgraded the Memorex disk capacity from 6G- to 9.6G bytes; upgraded the dial-up communications service to six multidrop lease lines; and converted from Taskmaster to a CICS software system.

The entire revamping process took a little more than six months. More important, the move increased NEA's on-line data storage capacity by 58%, trimmed actual on-line storage costs by about $10,000/mo. and will enable the 124-year-old teaching organization to save roughly $26,000/mo. in total DP expenditures during the next five years, Putro claimed.

The full NEA network now consists of four regional data centers serving the full 50 states and more than 100 interactive 3270-compatible information display terminals.

"Not only has the cost/performance of our computer operations improved measurably . . . but now we're averaging total hardware/software uptime in excess of 99%," he observed.

One of Putro's goals in restructuring NEA's DP operations was to improve throughput.

The NEA's work load was rising sharply. The NEA's activities include such things as collective bargaining, political action, conventions, special committees, providing budget analysis and school statistics and professional development at the local, state and national levels.

However, its rising work load prevented it from adequately serving its membership. For instance, last year, the center added eight states to its membership system and 28 to its research system. It also ended up printing more than a billion lines of information and processing some

(Continued on Page 54)

HP Graphics Display Terminal Offers Built-In Printer Option

PALO ALTO, Calif. — Hewlett-Packard Co. has announced the HP 2623A, a graphics display terminal that includes an optional built-in graphics printer.

The unit comes with a 512-by-390 dot screen resolution and can draw vectors at up to 9,600 bit/sec. The unit can be selectively updated without erasing the entire display, and graphics and alphanumeric data is stored independently to avoid interference between message and graphics information, the vendor said.

The HP2623A is supported by HP's business-oriented graphics software, the DSG/3000 package and the technically oriented Graphics/1000-II package. The unit costs $3,750 and the optional integral thermal printer costs $1,210.

A line drawing set costs $105 and a six-national-language keyboard option costs $105, the vendor said from 1501 Page Mill Road, Palo Alto, Calif. 94504.

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Bits & Pieces

Tally Printer Gets Bar Code Printer

SEATTLE — Mannesmann Tally Corp. has announced an OCR-A and OCR-B bar code printer for the firm's M-132 printer.

The size of the bar code is programmable and the standard printer includes a full Ascii OCR-A or OCR-B resident character set that can be interface-selected to print any one of seven popular bar code types, the vendor said.

Machine-readable symbols or characters are produced via a dual-line, nine-needle print head that prints an overlapping dot pattern to achieve a formed character appearance.

Paper can be bottom loaded or rear loaded and the unit can be optionally equipped with a second set of tractors to allow separate documents to be processed simultaneously, the vendor said.

The printers cost from $2,795, the vendor said from 215 Eighth Ave. N., Seattle, Wash. 98109.

Morrow Cuts Price Of M26 Hard Disk

RICHMOND, Calif. — Morrow Designs has cut the price of its M26, a 26M-byte hard disk subsystem, to $4,495, down from $4,995.

The subsystem features a 14-in. Winchester hard disk drive with a data transfer rate of up to 900M byte/sec, the vendor said.

The M26 is available from Morrow Designs, 5221 Central Ave., Richmond, Calif. 94804.

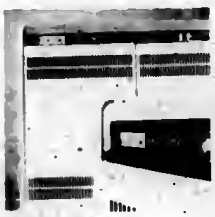
Optical Mark Reader Writes on Mag Tape

MINNEAPOLIS, Minn. — National Computer Systems, Inc. has announced Opscan 90/20, an optical mark reading unit that will transfer information directly to a host processor or write records on magnetic tape.

The scanner reads up to 900 full-page documents per hour and documents can vary in size from 3½- by 3½-in. to 8½- by 12-in., the vendor said.

The unit offers up to 44K bytes of bubble memory and operator controls consist of three push-button switches.

The Opscan 90/20 will be available in September and costs $29,500, or $945/mo on a five-year lease, the vendor said from 4401 W. 76th St., Minneapolis, Minn. 55435.



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(Continued from Page 53)

3,000 jobs weekly, Putro said.

In an effort to put together the best cost/performance center possible, NEA opted to supplement its 370/155 with the 4341 and replace the existing IBM storage devices with Memorex high-capacity disk and tape drives. The higher capacity enables the center to keep virtually all its data on-line and has reportedly resulted in improved system throughput. For example, the center now runs eight, nine and even 10 jobs concurrently.

In addition, the center expanded the system work space for tasks such as sorts, which radically speeded execution times, Putro said.

"With the Memorex gear and the 4341 CPU, CICS-initiated tasks now perform full file searches in about nine minutes, where previously it took 17 to 18 minutes."

There have been other benefits, also. The center now has both nonremovable as well as removable Memorex disk drives, which offer a chance to store frequently needed data on a nonremovable source. And the Memorex 3228 tape drives, which have replaced IBM 3420 units, are faster than the IBMs and have resulted in increased productivity.

Shared Access

Like the Memorex disk drives, the new tape storage devices are configured so that they can be shared between the center's two DP centers, Putro stated.

Currently, the center is looking toward office automation, electronic mail and word processing, built on existing and planned communications facilities.

IBM's Systems Network Architecture will be added by the end of this summer and will further reduce the center's need for regional minicomputers and service bureaus.

NEA recently got the go-ahead to take full advantage of its newfound computer power and to sell excess time as a service bureau.

Free Brochures

• "High Performance Monitors for Computer Graphics and Imaging" is a Ramtek Corp. booklet describing the factors involved in selecting a monitor. The 12-page pamphlet examines performance considerations including flyback time, pixel rise/fall time, video bandwidth, underscan and resolution.

The booklet, part of the "Ask Ramtek" series, also contains three approaches to configuring a raster scan color monitor's components. Other booklets in the series are "Pascal, A Programming Language for Today"; "Raster Scan, the Display Technology of the 80s"; and "Sophisticated Graphics for Control Systems."

Copies of any of the above can be obtained from Ramtek's Corporate Communications office at 2211 Lawson Lane, Santa Clara, Calif. 95050.

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PE Offers Megamini Five Ways

OCEANPORT, N.J. — Perkin-Elmer Corp. has announced five packaged system configurations of its Megamini Model 3230 minicomputer. The packaged systems include peripheral options and PE's OS/32 operating system.

The basic packaged system costs $108,800 and includes a Model 3230 processor with 1M bytes of memory, 1K bytes of direct mapped cache memory, the operating system, battery backup, system console, loader storage with bootloader, I/O chassis, 80M bytes of removable disk storage and a nine-track 45 instruction/sec 160 char./in. mag tape drive, the vendor said.

A $112,000 packaged system is available with 160M bytes of disk storage, and another package comes with a dual-density mag tape unit in addition to the basic package. That system costs $114,700, the vendor said.

A fourth system is equipped with both the dual Winchester disk unit and a dual-density tape unit for $118,900. The top-of-the line packaged system includes the base system plus a dual-density tape unit and 300M bytes of removable disk storage, the vendor said from 2 Crescent Place, Oceanport, N.J. 07757.

Disk System Runs on V70s

EL SEGUNDO, Calif. — Imperial Technology, Inc. has announced the Maxiram-V72, a disk replacement storage system for Sperry Univac V70 series of minicomputers.

The rack-mountable unit includes its own power supply, controller and blower assemblies. Capacity ranges from 512K- to 16M bytes and the unit is available in 512K-byte increments, the vendor said.

The unit costs $10,000 per 1M byte and is available immediately, the vendor said from 831 S. Douglas St., El Segundo, Calif. 90245.

DP, WP, Communications

Northern Telecom Adds Micro

MINNEAPOLIS, Minn. — Northern Telecom, Inc. has announced the Model 503, a microprocessor-based desktop processor that offers data processing, word processing and communications capabilities.

The Model 503 can operate in a stand-alone or small distributed environment. It is compatible with Northern Telecom's larger distributed processors, the firm said.

Model 503 features a CRT terminal unit with detachable keyboard. It offers 64K bytes of main memory and up to 3M bytes of disk storage. For data processing functions, the Model 503 supports Cobol, Basic and TAL 2000 programming languages.

Northern Telecom's Model 503

Letter Writing

In a word processing mode, the unit uses the firm's Omniword software, which can be used for letter writing and document handling using the firm's Striker 42 char./sec letter-quality printer.

In a communications mode Model 503 supports asynchronous, binary synchronous or IBM's Synchronous Data Link Control (SDLC) modes at up to 9,600 bit/sec. The desktop processor supports IBM's 2770, 2780 and 3780 protocols in an interactive remote job entry application.

In addition, the processor can be used for remote job entry functions and can be used in Northern Telecom's network control system, which provides automatic polling and selection of remote Model 503s and other Northern Telecom distributed systems, the firm said.

The Model 503 is compatible with Northern Telecom's Model 405, 435, 445, 585 and other 503 systems through Omnilink, the vendor's resource sharing feature. The feature allows disk files on any system in a network to be accessed by any other authorized system in the network. It also allows systems to share peripherals such as magnetic tape drives, printers and modems. Up to 16 systems can share resources through the Omnilink network arrangement, the vendor said.

Model 503 comes with a 15-in., 2,000-char. display and a 78-key keyboard with a 10-key numeric pad, the vendor said.

The cable-connected diskette cabinet houses either two or four minidiskettes, each capable of storing 800K characters of formatted data. Model 503 also supports the firm's microprocessor-based 5printer printer at 72-, 144- or 180 char./sec. It also supports the 5ider printer at 300 line/min and the Striker word processing printer at 42 char./sec, according to the vendor.

The unit is equipped with built-in diagnostic features for power-on and general system testing.

The base price for the Model 503 is $6,490. The vendor can be reached at Data Park, Box 1222, Minneapolis, Minn. 55440.

Printer Runs Off Printer Port

STAMFORD, Conn. — The Remote Printing 5ystem (RPS) from Digital Associates Corp. operates off the printer port instead of the communications port to reduce transmission time for minicomputer users, according to its vendor.

The RPS is a remote line printing system that is compatible with Digital Equipment Corp., Data General Corp. and Prime Computer, Inc. minicomputers. It reportedly allows a line printer to run at the fully rated speed.

Other features are the elimination of minicomputer processor degradation that occurs when a line printer is operated through the communications port; data compression that results in savings in line use charges and increased throughput speeds; and increased reliability of line printers, the vendor said.

The RPS system consists of a transmission and receiving unit, as well as modems, if necessary. It is priced at about $10,000 for the 300 line/min version, depending on the configuration.

RPS for the 1,000 line/min printer is available for an average price of $21,000, the vendor said from 1039 E. Main St., Stamford, Conn. 06902.

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Mini Bits

Ampak Introduces Printer For System/38 and 34

IRVINE, Calif. — Ampak Business Systems, Inc. has announced a letter-quality printer for IBM System/38 and System/34 processors.

Called the Lettero.34/38, the unit can be used as a replacement for the IBM 5256 printer, Ampak said.

The unit costs $5,895. Ampak can be reached at P.O. Box 17494, Irvine, Calif. 92713.

Cardmation Interface Links Printers to DEC Minis

FRAZER, Pa. — Cardmation Co. has expanded its line of printer interfaces to include Digital Equipment Corp. 16-bit minicomputers.

The controllers include interfaces for four printer lines, General Electric Co., DEC Data Products Corp. and Centronics, Inc. printers.

The firm is offering eight printer boards for DEC's PDP-11 and LSI-11 processors. The boards offer both hardware and software compatibility with DEC products, the vendor said.

The PDP-11 interface costs $520 and $470 for the LSI-11 modules, the firm said from P.O. Box 746, Frazer, Pa. 19355.

Medical Turnkey Bows

PITTSBURGH, Pa. — A medical office turnkey system offering applications for appointment systems, office management and medical records options is available from Medical-Pharmacy Management, Inc.

The Medical Office Program performs cross verification with patient systems, independent scheduling for various physicians, accounts receivable, word processing, blood/gas analysis and other tasks.

It is composed of a Wang Laboratories, Inc. 2200 MVP hard disk system with multiple workstations.

It. costs between $30,000 and $50,000, Medical-Pharmacy said from P.O. Box 13165, Pittsburgh, Pa. 15243.

HP Unveils Power Supply

PALO ALTO, Calif. — Hewlett-Packard Co. has announced a dc power supply for its desktop computers that features a bidirectional interface and auto-ranging features.

Called the HP 6034A, the unit combines an internal microprocessor-based HP-IB programmer with FET-switching technology to provide laboratory-grade performance specifications, the vendor said.

The unit provides communication between a controller and the recently introduced HP 9826 desktop computer and the power supply, the vendor said.

The unit costs $2,700, the vendor said from 1507 Page Mill Road, Palo Alto, Calif. 94304.

Dylon Adds HP Peripheral

SAN DIEGO — A magnetic tape peripheral compatible with Hewlett-Packard Co. 1000L and XL series processors has been announced by Dylon Corp.

The Dylon Series 10 magnetic tape recorder is said to generate ECMA and Ansi standard ½-in. tapes in reel sizes from 7- to 10½ in. The average transfer rate is more than 200K byte/sec and the system operates with dual-density, 800- to 1,600 char./in. to 45 in./sec.

No software utilities are required. Prices range from $8,895 to $14,895 from the firm at 10130 Sorrento Valley Road, San Diego, Calif. 92121.

Microstar Memory Updated

IRVINE, Calif. — Micro Five Corp. has announced memory expansions on its Microstar II small business system.

Options allow the user to expand from the standard 128K-byte system to 256K- or 384K bytes. Factory-installed 128K-byte increments cost $3,000. Field upgrade kits are also available, the vendor said.

A basic Microstar II configuration costs $12,000, the vendor said from 17790 Sky Park Circle, Irvine, Calif. 92714.

High-Density Disk Offered

CLEVELAND — Computer Resources, Inc. has announced the 6016, a high-density single disk cartridge that is compatible with Control Data Corp.'s 9448 cartridge module and equivalent Honeywell, Inc., Prime Computer Corp., NCR Corp. and Wang Laboratories, Inc. disk drives.

Features include a smooth disk surface and high resolution and a spindle mounting system that can withstand thousands of insertion/removal cycles, the vendor said. The cartridge costs $250, the vendor said from 4650 W. 160th St., Cleveland, Ohio 44135.

Intel Units Get Controller

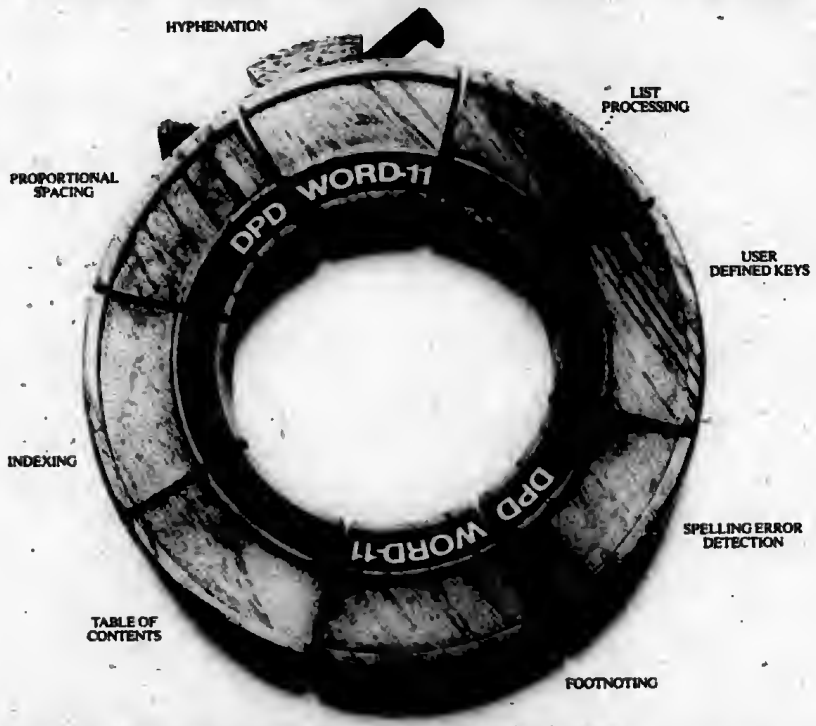
W. LOS ANGELES, Calif. — An intelligent diskette drive controller for Intel Corp. Multibus-based systems has been announced by Persci, Inc.

The Model 1180 is a single-density or double-density controller that operates with IBM one- or two-dimensional formats on single- or double-sided drives, the vendor said.

The controller's command set allows data storage and retrieval at a level ranging from sector write/read to the file management capabilities of advanced disk operating systems.

The 1180 controller is priced at $950 with 60 days delivery from Persci, Inc., 12210 Nebraska Ave., W. Los Angeles, Calif. 90025.

The Whole Truth About PDP-11 Word Processing.



When you explore word processing systems, you'll find a number of systems that offer part of the package. And frankly, if you're only looking for text editing, almost any system will do.

But if you're looking for full word processing capabilities, you should insist on a system that can handle all of the tough tasks you'll encounter.

For starters, a good system will have list processing, the vital function that generates correspondence, reports, even statistical analyses. It should have user defined keys to simplify repetitive operations.

And a good system can handle the details. Like spelling error detection, automatic renumbering of footnotes, tables of contents and indexes. And proportional spacing and hyphenation for professional looking documents.

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Data Processing Design, Inc.

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Zendex Unveils Micro Line, Integrated Workstations

DUBLIN, Calif. — Zendex Corp. has announced the System 200 series of integrated workstations and a line of microcomputers for medium-size businesses.

The workstations feature two single-sided floppy disks and a two-slot multibus backplane. System 235 features a Zendex ZX-85 integrated processor board with an 8085 microprocessor and 64K bytes of memory with two serial RS-232C ports and software-selectable transmission rates. System 238 features the Zendex ZX-88 integrated processor board with an 8088 microprocessor and up to 6K bytes of memory. Both systems are CP/M MP/M-compatible and cost approximately $8,000, the vendor said.

The firm also announced a line of 8- and 16-bit small business systems that offer 192K bytes of main memory that can be expanded to 1M bytes. The processors also feature up to 30M bytes of removable hard disk storage with an option to add additional external memory, the vendor said.

The small business systems cost between $11,000 and $37,000, the firm said from 6680 Sierra Lane, Dublin, Calif. 94566.

CDC Upgrades Certainty 270-10

MINNEAPOLIS — Control Data Corp. has announced an upgrade option for its Certainty 270-10 storage module drive disk storage system used with IBM Series/1 minicomputers.

The unit reportedly includes 63M bytes of formatted data storage capacity. It is mounted in a pull-out drawer in the base of the cabinet and can be installed by a CDC customer engineer.

End-user price of the Certainty 270-20 is $11,135 in quantities of five through nine; delivery is scheduled 45 days after order. The vendor can be reached at Box O, Minneapolis, Minn. 55440.

Minimeg Boasts Single Board

ANAHEIM, Calif. — Integrated Digital Products, Inc. has announced the Minimeg, a solid-state memory system that includes the controller and memory on a single board.

The board is compatible with Data General Corp. Nova 1200, Nova 2, Nova 3, Eclipse and other vendor's processors. Software is compatible with DG's 4019 disk controller.

The unit offers up to 2M bytes of memory, an address-selectable DIP switch that allows the use of multiple Minimeg boards sharing the same device code for a total possible capacity of 32M bytes.

The memory boards start at $2,800, the vendor said from 3150 E. La Palma Ave., Anaheim, Calif. 92806.

DEC Users Get Winchester Unit

SUNNYVALE, Calif. — Advanced Electronics Design, Inc. has introduced the Winc-08, a Winchester disk system that provides Digital Equipment Corp. users with 41.6M bytes of memory and emulates the DEC RL02 cartridge drive.

The Winc-08 is smaller than the DEC RL02 and reportedly provides the user with four times the storage capacity in one-half the physical space, Advanced Electronics Design claimed.

The drives are partitioned into two logical sections so that each physical drive reportedly looks like two RL02 cartridge drives. The Winc-08 is thus software-transparent to DEC operating systems, enabling users of both LSI-11s and PDP-11s to couple unusually high-capacity Winchester storage capability to their CPUs, according to the firm.

The Winc-08 System, including one drive, power supply, controller and interface card in a 5¼-in. package, costs $8,445 with delivery eight weeks after receipt of order, the vendor said from 440 Potrero Ave., Sunnyvale, Calif. 94086.

Freight Carriers Get Turnkey

NEW BRUNSWICK, N.J. — Princeton Computer Systems, Inc. has announced a turnkey system for motor freight applications.

The system combines the firm's MFT software package with a NEC Information Systems Astra minicomputer. Called the Astra/MFT, the turnkey system addresses the needs of motor freight carriers operating single or multiple terminal systems.

Freight bills and customer statements may be printed daily, bi-weekly, weekly or in any other schedule required by the carrier. Freight is automatically tracked until the consignee, shipper or third party pays the freight charges, according to the vendor.

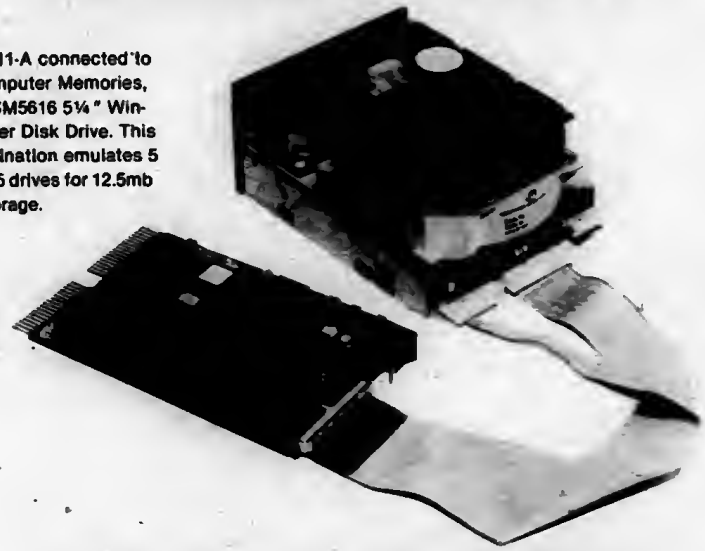
Other features include an automatic freight rating system as well as accounting functions, according to the vendor.

The complete system costs $29,990, Princeton Computer Systems said from 205 Livingston Ave., New Brunswick, N.J. 08901.

AT LAST . . .

A DUAL WIDTH, SINGLE CARD, WINCHESTER CONTROLLER FOR Q-BUS SYSTEMS — THE WDC11

WDC11-A connected to a Computer Memories, Inc. CM5616 5¼" Winchester Disk Drive. This combination emulates 5 RK-05 drives for 12.5mb of storage.



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COMING SOON:

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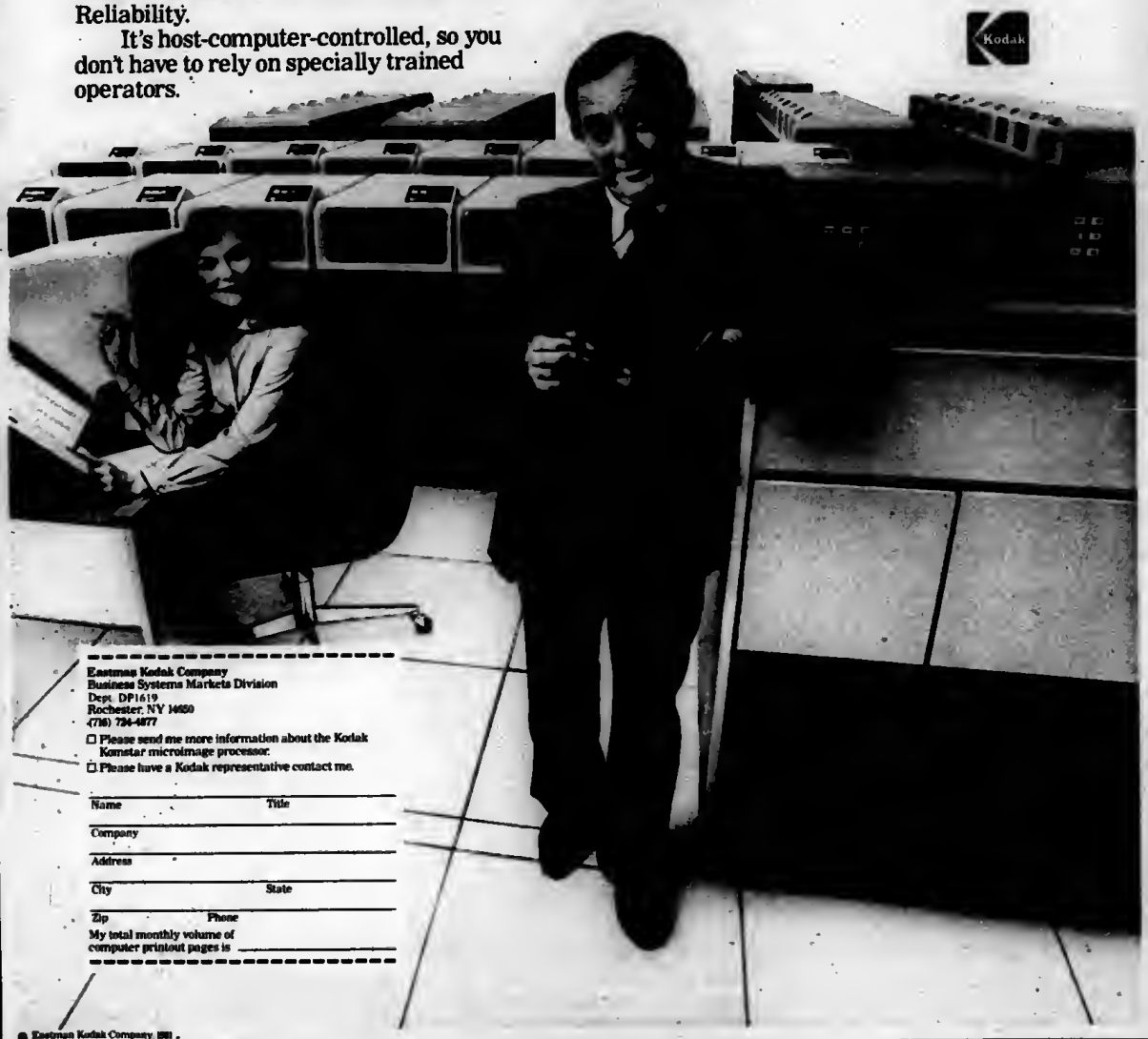

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Net Dives, But Sperry Optimistic

By Bob Johnson
CW New York Bureau

NEW YORK — Sperry Corp. will invest $2.5 billion in high-technology research and development over the next five years and is optimistic about the growth of its Univac Division despite a 75% earnings drop in its first quarter.

These were some of the statements delivered by J. Paul Lyet, Sperry's chairman and chief executive officer at the company's recent annual stockholder's meeting here.

Lyet blamed Univac's poor first quarter earnings on high interest rates, foreign currency fluctuations, inflation and the sudden strength of the U.S. dollar. Explaining that the dollar's value in relationship to most major foreign currencies increased, Lyet said, "The effect

(Continued on Page 64)

To Former Employees

Wang Sells Off HRMS Line

LAWRENCE, Mass. — Wang Laboratories, Inc. has sold its Human Resource Management System (HRMS) software line to a group of former employees. Heading the new company, known as Generated Systems, Inc., is Lawrence J. Munini, who directed the product group at Wang for the past nine years.

Wang decided to divest the IBM-based HRMS system in late April because it did not fit into the company's long-term plan for pursuing the office systems market.

The HRMS system was acquired in 1968 as part of Wang's acquisition of Philip Hankins, Inc. At the time, Wang was looking to get into programmable devices to augment its calculator line.

Munini declined to disclose the terms of the HRMS sale to Generated Systems, but noted some 25 former Wang employees are now working at the company. Other Wang employees involved with the project are relocating within Wang.

Currently, there are more than 400 installations of the system, which is written for both the IBM OS and DOS environment. Munini described major competitors as Management Science America, Inc. and Information Science, Inc.

No Active Marketing

Although the software has not been actively marketed by Wang for the past year and a half, the firm sold 35 systems last year, Munini noted. This represented about $1.5 million in sales. With a dedicated sales force, selling nationwide, Munini said he expects the firm to enhance sales significantly in the near future.

Because the Wang sales force placed little emphasis on the product, enhancements are necessary to make the system competitive. The firm has a number of enhancements in the works. The company is now ready to announce a front end that operates under IBM's CICS to provide on-line inquiry into personnel information. Munini said the company in the future also will provide inquiry function against IBM's IMS.

The company was purchased by Munini, other employees and two outside investors. Munini said the company would not need further financing in the immediate future.

Other principals joining the new firm from Wang are Robert Pomerleau, chief financial officer; Linda Koski, vice-president of product support; Arthur Teichmann, vice-president of sales and marketing; and Arthur Willner, vice-president of development.

The Japanese-American Connection

• Joint Venture Consulting Unit Backs Japanese-American Firms

By Bob Johnson
CW New York Bureau

NEW YORK — An anticipated invasion by Japanese businesses in the eastern U.S. recently spurred the establishment here of a joint venture DP consulting firm concentrating on Japanese-American companies.

Combining resources to form what they call a "unique data processing resource" were Management Information Science International, a Japanese DP consulting and software development firm, and Mellinger & Associates, Inc., a New York consulting group. The newly formed company, known as Misi Co. Ltd. of New York, will offer Japanese-American companies and institutions access to bilingual, interactive, results-oriented DP expertise, the company claimed.

Misi was actually formed three years ago in California as the U.S. subsidiary of the Japanese consulting firm. That company, known as Misi Co. Ltd. California, has compiled a roster of clients that includes American Honda Motor Co., Sony Corp. of San Diego, Kenwood Electronics and Nippon Express.

Feeling that the eastern por-

(Continued on Page 62)

• Fuyo Sets Up Bureau Here To Find Joint Venture Partners

By Robert Batt
CW West Coast Bureau

GARDENA, Calif. — Fuyo Data Processing and Systems Development Ltd. has set up a U.S. bureau to give U.S. software companies a chance to break into the Japanese market. The Tokyo-based firm, part of the Fuyo Financial Group headed by Fuji Bank, is on the lookout for joint ventures with U.S. companies in an attempt to increase its range of quality software.

Alan Dash, a former system support manager at Computer Sciences Corp. who has 15 years of experience doing business with Japan and China, has been named as the company's director of international marketing.

He told *Computerworld*: "For a long time, Japanese companies were reluctant to make use of ready-made software packages. But with the shortage of skilled programmers there is a growing acceptability in Japan of the need for such packages and that is why we have set up a U.S. office."

The charter of the office, Dash said, is to contact top-quality software companies in the U.S. with the intention of aggressively marketing their software

(Continued on Page 60)

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Fuyo Sets Up Bureau to Find Joint Ventures

(Continued from Page 59)

packages and services in Japan, thus reducing difficulties associated with language and cultural differences.

The company claimed it is close to concluding a joint venture agreement with a U.S. software firm to carry out experiments in the software field. Its first project will be to design a software package that can interpret Chinese characters.

"There are lots of machines around that can print out Chinese characters. This new product, however, is designed to get meaning out of the characters and have input readily understood by the software program. This is a much more difficult process," Dash explained.

Funding, Marketing Network

Under the proposed joint venture, nounce within the next few months, the U.S. company will get funding and a marketing network in Japan from Fuyo in return for access to its software expertise.

Dash asserted that the setting up of a U.S. office in Southern California was a significant step forward in enabling U.S. software firms to do business in Japan. Up until now, he said, the usual method of collaboration was to select a Japanese partner in an ad hoc fashion, relying on personal contacts. Fuyo's aim, however, was to organize a more systematic approach to its choice of U.S. partners.

In looking at possible joint ventures, Fuyo would thoroughly check out U.S. companies with users and examine their products in an attempt to resolve possible problems before negotiations began. Companies that Fuyo is known to be interested in include Informatics, Inc., Applied Data Research, Inc., Pansophic Systems, Inc. and information Science, inc.

Fuyo at Home

In Japan, Fuyo specializes in software development for large corporations and government agencies. Scientific and business applications are the two major areas of development and customers include the Ministry of Foreign Affairs, various prefectural governments in Japan, the defense and environmental agencies and private enterprises such as the Kajima construction company.

According to Fuyo, the advantage of having a presence in the U.S. is that communication is made much easier, the language problem is minimized and costs are cut down. The company said that at present it has no plans to market Japanese software in the U.S., although with the increasing strength of Japanese software for use in microcomputers, the U.S. bureau could become a marketing outlet at a later date for this type of product.

Fuyo claimed that the incentive for U.S. software companies to compete more vigorously in Japan is strong. Japan, it said, possesses the second largest computer market in the world and so has an enormous potential market for software, particularly for use with IBM and IBM-compatible operating systems.

"Until now, each company in Japan had a tendency to invent its own application software. But with the country beginning to experience a programmer shortage, it is becoming more economical to use systems packages. The Japanese are realizing that with the unbundling of software they are going to have to pay for good software," Jun Tedori, manager of Fuyo's Information Systems Division, said.

Initial Focus

The company added that while the initial focus would be on system software, there were also plans to market U.S. application packages in Japan later on. Criteria adopted in selecting suitable software would include ease of use and maintenance and the reputation of the U.S. software company itself.

"Software for data base management systems (DBMS) will be the hottest market in Japan for U.S. software companies," Dash added. He said Fuyo was also pursuing contacts with the government of the People's Republic of China to market Japanese software in that country. If these talks were successful, U.S. companies associated with Fuyo would gain an indirect entree into another huge market.

In the financial year ending March 31, Fuyo Data Processing and Systems Development Ltd. recorded revenues of $11.4 million and net income of $.88 million.

More information may be obtained from the company, which is located at 1551 Redondo Beach Blvd., Gardena, Calif. 90247.

Pamphlet Issued To Aid Marketing

MEMPHIS, Tenn. — A monthly 12-page pamphlet designed to help computer companies become better marketers has been introduced by Datasearch, Inc.

The *Computer Sales Digest* will include sections on selling techniques, marketing and business opportunities, questions and answers, a manager's clinic and a promotions clinic, the company said.

The regular subscription is $95 annually from Datasearch, Inc., 494 William Arnold, Memphis, Tenn. 38117.

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Packages Only 4.3% of Sales In European Hardware Mart

VENDOR	ORIGIN	1979 REVENUE (Millions)
IBM	U.S.	$268.6
ICL	UK	65.2
CII HB/HIS	US/France	55.6
Olivetti	Italy	46.7
Philips	Netherlands	46.5
DEC	U.S.	34.7
Univac	U.S.	32.3
Triumph-Adler	Germany	26.8
Siemens	Germany	21.8
Burroughs	U.S.	21.7
NCR	U.S.	20.6
Other		119.8
TOTAL		$760.3

Hardware Vendors' Packaged Software Market by Vendor

LONDON — While hardware vendors in Europe expect packaged software to represent a significant portion of their revenues by the end of the decade, they still have a long way to go. Revenues from packaged software accounted for only 4.3% of total 1979 hardware revenues, estimated at $17.8 billion, according to an International Data Corp. (IDC) Europa Ltd. report.

However, there are indications that many vendors are developing strategies that will direct users toward greater acceptance of their packages, the report concluded.

During 1979, hardware vendors in Europe generated $760 million in packaged software revenues, but these revenues will grow to $3 billion by 1984, an annual growth of 31.7%, the report forecast.

By comparison, independent packaged software suppliers had sales of about $328 million in 1979.

IBM's revenues from packaged software in Western Europe were estimated at $268.6 million, or a 35% share of the market, IDC Europa noted. Furthermore, the report forecast that by 1984 IBM could have sales of $2.7 billion worldwide from software, with about $1 billion coming from Western Europe. International Computers Ltd. followed with $65 million in packaged sales, while CII-Honeywell Bull was third with about $56 million, IDC Europa estimated (see related chart).

Packaged Success

Although packaged software still accounts for an extremely small percentage of mainframe vendors' sales in Western Europe, small business systems vendors have been more successful selling packaged software, deriving, in some cases, about 10% to 15% of their revenues from this source.

Driving the acceptance of packaged software is the trend toward the decentralization of computer power, which requires both more software and a greater degree of "user-friendly" software for use by non-DP personnel.

Despite the growing number of benefits from users acquiring packaged software, mainframe vendors will have quite a bit of competition from independent software companies. Because users are now forced to buy more software as a result of the unbundling process by hardware vendors, these users are becoming more sophisticated in evaluating software and may question whether hardware vendors' packages offer the best results, the report said.

Moreover, turnkey systems, consultants and service bureaus offer attractive alternatives to packaged software. The strength of these sectors, particularly in France and West Germany, could hinder the growth of software sales by hardware vendors, the report explained.

The report, "Hardware Vendors' Packaged Software Markets — Western Europe 1979-1984," is available for about $2,500 from IDC Europa, 2 Bath Road, London, W4 1LN, U.K.

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Report Covers Courseware Market

SAN FRANCISCO — "The 1981 Courseware Market Report," a reference work for companies, educational institutions and individuals involved in courseware development and selection, has been published by Shotwell and Associates, Inc., a consulting firm.

Shotwell developed the report with Designware, Inc., a courseware development company.

The report is available for $175. Shotwell is in Suite 395, The Wharfside Building, 680 Beach St., San Francisco, Calif. 94109.

Group Backs Japanese-U.S. Joint Ventures

(Continued from Page 59)
tion of the U.S. has a substantial number of Japanese-American businesses that lack required DP services, Misi searched for an American consulting firm that it felt could offer American expertise in the field.

Misi will provide services in computer and management consulting, systems applications, programming, technical support services and computer operations management, according to a company brochure. Educational seminars in such areas as systems design, structured design, on-line concepts, data base design, structured programming and distributed processing will also be available.

Culture Shock

Mellinger worked with Mitsubishi International Corp. in setting up a network of IBM/System 34 computers in 1980, according to Catherine T. Kazienko, Mellinger executive vice-president. The design, programming and implementation of a financial system for Mitsubishi was conducted under the Japanese management style.

"Some of our consultants went into cultural shock the first few weeks," Kazienko said, referring to the minute detail and weekly performance reports that were required.

But a firm that understood the Japanese way of management appealed to Misi in its search for a partner in the joint venture.

Kazienko said Japanese companies in the U.S. don't do their own DP work; it is very difficult for them to find Japanese programmers in the U.S. because most Japanese programmers here have been brought over from Japan by their companies. By tradition, the Japanese are loyal to that company.

The combination of Misi's interpretive abilities where applications and specifications are determined from the Japanese language and Mellinger's familiarity with Japanese approaches to management convinced Misi that the partnership would be auccessful, Kazienko said.

"In developing a system today, it is no longer the DP department that has the final word, but the users. Japanese companies have Japanese users and it's hard to communicate American DP principles," she added.

A concentration on New York is planned by Misi because there are many Japanese companies in New York that have no DP and some that are not yet automated, according to Kazienko.

When asked how Misi feels about the current controversy surrounding the Japanese influence in business, especially in DP, Kazienko stated that the company will be putting Americans to work by servicing Japanese companies here. "The products produced by these companies will generate better economics within the U.S., in constrast to their being imported," she said.

Added benefits could include the fact that American DPers will be exposed to the Japanese style of management, a style which she noted taught programmers things for which they eventually thanked her.

Datapro Seminars

September through December 1981

TEN NEW SEMINARS

		New York	San Francisco	Chicago	Washington	Los Angeles	Atlanta (A) Denver (D)	Houston (H) Dallas (D)	Boston	San Diego
DC-1	Data Communications: An Introduction to Concepts and Systems	9/14-16 12/7-9	9/21-23	11/4-6	10/26-28 12/14-16	12/14-16	(D) 11/9-11	(H) 10/19-21	11/16-18	
DC-2	Data Communications: Advanced Concepts and Systems	12/14-15	10/26-27	10/5-6	10/1-2	11/12-13	(D) 11/30-12/1	(H) 12/17-18	9/17-18	
DC-3	Data Communications: Effective Network Design	11/4-6	10/19-21	11/16-18	9/9-11				11/30-12-2	
DC-4	Introduction to Teleprocessing Software	11/30-12/2	9/21-23	11/4-6	9/14-16				12/7-9	10/14-16
DC-5	Distributed Systems: Effective Approaches and Applications	12/9-11	11/4-6	9/14-16	10/21-23	12/16-18			9/23-25	
SS-1	Information Systems Planning: A Structured Approach	9/21-23	10/26-28	10/19-21	11/16-18					
SS-2	Systems Analysis and Design: Concepts and Effective Practice	11/11-13	10/21-23	9/23-25	9/16-18		(A) 11/30-12/2 (D) 12/9-11		12/16-18	
SS-3	NEW Structured Systems Analysis, Design and Programming	9/14-16	9/21-23	10/19-21	10/26-28			(D) 11/30-12-2		
SS-4	NEW Evaluating and Selecting Computer Software Packages	11/2-4	10/12-14	11/9-11	12/14-16			(H) 11/30-12/2		
SS-5	NEW Structured Testing	11/4-6	9/21-23	10/14-16	12/9-11					
SS-6	Data Base Management Systems: Concepts and Guidelines	11/18-20	11/9-11	9/14-16	10/14-16			(H) 12/14-16	9/23-25	
SS-7	Data Base Management Systems: A Comparative Analysis	9/23-25	12/14-16	10/14-16	11/18-20		(D) 10/21-23			
SS-8	NEW Effective Data Base Management	11/30-12/2	10/19-21	11/16-18	9/21-23		(D) 12/7-9			
EM-1	EDP Operations Today: Effective Scheduling and Console Operation	11/9-11	10/26-28	9/23-25	10/12-14					
EM-2	Effective Computer Operations Management	9/14-16	9/16-18	10/14-16	10/26-28					12/9-11
EM-3	NEW Computer Performance Measurement and Capacity Planning	11/4-6	11/16-18	11/30-12/2	9/30-10/2					
EM-4	EDP Project Management: A Practical Approach	9/9-11	10/14-16	9/30-10/2	12/14-16	11/30-12/2				
EM-5	Advanced EDP Management: Methods and Techniques in the 80's	9/21-23	10/26-28	11/16-18						
OA-1	Introduction to Word Processing: Concepts, Systems and Applications	11/16-18	11/4-6	10/14-16	9/9-11	12/14-16	(A) 12/2-4			
OA-2	Word Processing: Effective Operations Management	9/21-23	10/14-16	11/16-18	12/14-16			(D) 11/11-13		
OA-3	Integration of Word Processing and EDP Systems	12/2-4	11/11-13	11/4-6	9/14-16		(D) 12/14-16		10/14-16	
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G-5	Using PASCAL/ADA for Increased Programming Efficiency	9/21-23	11/16-18	10/26-28	12/7-9					
G-6	Using Computer Graphics: Techniques, Systems and Applications	11/30-12/2	11/16-18	11/4-6	10/19-21					
G-7	Effective Oral Presentation Techniques for DP Professionals	9/21-23	10/19-21	10/26-28	11/16-18					
MB-1	NEW Accessing and Utilizing Public Data Bases	11/9	12/14	11/2	10/19					
MB-2	NEW Local Networks	11/10	12/15	11/3	10/20					

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New Companies

Sheila Catz Associates is a consulting services firm specializing in the management of data processing functions for small businesses as well as Fortune 500 companies. The company is located at Suite 602, H. W. Oliver Building, Pittsburgh, Pa. 15222.

Structured Systems, Inc. is a new firm offering management consulting services as well as packaged software for on-line processing of medical and dental claims. The firm is located at 264 Cypress Creek Road, Severna Park, Md. 21146.

Amicus Research Group, Ltd., a new research firm, has been formed as a joint venture by Berul Associates, Ltd., Cuadra Associates, Inc. and Peyton R. Neal & Associates, Inc., and is located at Suite E, 5010 Nicholson Lane, Rockville, Md. 29852.

Survey: Hobbyist Retailers Selling More Business Units

ATLANTA — Once thought to sell systems only for the hobbyist market, the independent computer retailer is now selling more and more small business systems, according to a recent survey.

Small business systems accounted for 50.8% of independent retailers' sales in 1980, with the average system priced at nearly $9,500, according to a survey by *Computer Retailing* magazine. Typically, it took the retailer about 5 weeks to close the sale, and first year after-market sales brought in an additional $1,771 per system, these retailers reported.

By contrast, systems houses noted that small business systems with an average price of $17,224 accounted for 62.4% of their sales. The time it took to close a deal was seven weeks, and the first year after-market sales per system were $3,666.

Office machine dealers reported small business systems comprised 61% of their computer sales, with the average system priced at $14,480 and first year after sales were $1,750 per system.

The study further revealed that nearly 40% of the independent retailers reported monthly gross sales of more than $40,000, that 47.5% have been in business for more than two years and that nearly 55% utilize an outside sales staff.

By comparison, 30% of the systems houses participating in the survey said that they had monthly sales of $40,000, that 60% have been in operation for more than two years and that 80% employ an outside sales staff.

The 18-page report entitled "Census '80" is available for $50 from *Computer Retailing*, 1760 Peachtree Road, Atlanta, Ga. 30357.

Expansions

Infotron Systems Corp. has moved to larger quarters located at the Cherry Hill Industrial Center, Cherry Hill, N.J. 08003.

CPT Corp. has recently broken ground for a $7 million addition to its corporate headquarters in Eden Prairie, Minn.

Docutel Corp. has purchased an existing 64,000 sq-ft building adjacent to the company's manufacturing, accounting and product development operations in Irving, Texas.

Racal-Milgo, Inc.'s sales and marketing departments will be moving in October to a new 33,000-sq-ft facility in Plantation, Fla.

Vanier Graphics Corp. has opened a new production facility in Flanders, N.J., and has also broken ground for a long-run custom and stock continuous business forms plant in San Antonio, Texas.

Cipher Data Products, Inc. has expanded its marketing and sales activities to a new 23,000-sq-ft building adjacent to its corporate headquarters in San Diego, Calif.

Trilogy Systems Corp. recently held ground-breaking ceremonies for new facilities covering approximately 240,000 sq ft, to be constructed over a two-year period in Cupertino, Calif.

Xylogics, Inc. has announced the acquisition of an additional 28,000-sq-ft facility in Burlington, Mass.

Integrated Digital Products Corp. has moved its corporate headquarters and manufacturing operations to a larger facility with 4,000 sq ft of manufacturing space. The new location is at Unit A, 3156 E. Palma Ave., Anaheim, Calif. 92806.

Seminar to Cover Market Strategies For European Telecommunications

NEW YORK — The structure of the European telecommunications marketplace and marketing strategies for U.S. vendors there will be the focus of an Oct. 20-22 seminar sponsored here by Frost & Sullivan, Inc.

The seminar will explore those aspects of the European telecommunications market that differ from the North American marketplace; the various new developments in telecommunications in Europe, both from the point of view of the postal, telephone and telegraph (PTT) administrations and of the private-sector user; and the attitudes of European users as they affect the design and marketing of telecommunications equipment.

Other topics to be covered at the seminar include the strategies adopted by some of Europe's larger PTTs; elements at play in the telecommunications market in instances of mergers with the data processing and office equipment markets; and current and future roles that telecommunications authorities play in Europe in terms of marketing guidelines and demands for products.

The cost of this seminar is $750; additional attendees from the same company are eligible for a 20% discount. Further details can be obtained by contacting Bob Sanzo, Frost & Sullivan, Inc., 106 Fulton St., New York, N.Y. 10038.

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Leonard Kleinrock on
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If you are plagued by queueing problems, then this seminar is a must! Leonard Kleinrock is the leading authority in Queueing Theory and its application to computer systems. He will provide the necessary tools for you to understand and predict system throughput, delay and efficiency. Are you aware of economies of scale in these performance measures and their application? The latest methods of queueing theory will be developed in sufficient depth to enable you to apply these techniques to your modern engineering systems problems.

Boston — November 3–5, 1981

Peter Denning on
Performance Evaluation

This seminar will enable you to make accurate appraisals of a new system's ability to handle your current and anticipated workload. You will learn to develop your intuition about computer performance problems, to calculate the performance measures of common interest and to use operational quantities — those you can measure and verify in a system. These keys to Performance Evaluation are detailed by Peter Denning, the originator of the Working Set Concept and the President of ACM.

Palo Alto — October 12–14, 1981

Algirdas Avizienis on
Reliable Computing Through Fault Tolerance

Fault-tolerance makes perfection in hardware and software **unnecessary** as a prerequisite for reliable and uninterrupted information processing activity. It offers all of the advantages of the perfect system without the inherent costs that they require. This seminar, lead by the "Father of Fault-Tolerance," Algirdas Avizienis, will detail how fault-tolerance makes use of self-testing and self-repairing of errors within the system itself. Act now, become Fault-Tolerant!

San Francisco — October 26–28, 1981

Leonard Kleinrock on
Computer Networks

Computer Networks are dominating the world of data processing. This fast-paced seminar, lead by Dr. Leonard Kleinrock, incorporates the use, operation and evaluation of modern computer networks as well as their form and impact on future teleprocessing. This seminar will acquaint users, engineers and technically-oriented managers with the modern techniques of computer networks from both an analytical and a practical point of view. Learn the magic of packet switching!

San Francisco — November 17–19, 1981

Philip Bernstein on
Database System Technologies

Harvard's Philip Bernstein is the speaker for this three-day seminar which provides a comprehensive understanding of a Database Management System (DBMS). Since most routine data processing is accomplished with the help of a DBMS, it is important for DP professionals to know the facilities that every DBMS should provide and the implementation techniques that support these facilities. Dr. Bernstein covers these topics and others through a decomposition of a DBMS and through many case studies.

San Francisco — November 4–6, 1981

William Pratt on
Digital Image Processing and Analysis

In this brand new seminar, Dr. William Pratt will show you how "digital image processing" can transform a normal picture into an information-packed image that goes beyond its apparent beauty. Using the latest technologies, you can enhance the visual quality of degraded images, digitally code images for most efficient transmission and storage, and automatically analyze the contents of an image. Incorporate digital image processing and analysis into your system, its application potential and benefits will astound you.

Washington, D.C. — Nov. 16-18, 1981

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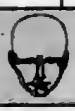

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Foreign Orders & Installations

Honeywell, Inc. has installed at a cost of approximately $1.4 million e large-scale Honeywell Level 66/DPS 8 computer using the CP-6 operating system et CAE Electronics, Ltd., Montreal, to provide concurrent, interactive time-sharing and transaction processing while eimultaneously accommodating local and remote batch processing.

Sperry Univac has received en order valued et $2.1 million from Toyota Auto Body Co. of the Toyota Motor Group in Japan. System 80 installations in Japan include Sun Store Co., Ltd., a supermarket chain in Shizuoka Perfecture end Morioka Gas Co. in Iwate Perfecture.

The company installed System 80 computer systems for the following customers in England: Pifco, a Manchester electrical goods distributor; Mitsui, importers of motorcycles and other equipment in Chessington Surrey; and Towers Housewares, manufacturers of household hardware in Wolverhampton. Deliveries of System 80 computers were also made to Woodfield and Stanley in Huddersfield; The South West Examination Board in Bristol; and Gloenco in Droitwich, all in England.

Sperry Optimism High Despite Dropping Net

(Continued from Page 59)

of the strong dollar on Sperry involves e widely disputed accounting standard (FASB-8), and it often causes extraordinary — and, I believe, unnecessary — impact on our business."

As an example, Lyet spoke ebout the company's computer systems where Sperry carries substantial sums of customer receivables. The five-year leases of computer equipment under FASB-8 calls for the receivebles to be valued et current rates at the conclusion of each fiscal quarter. The strong dollar means that those receivables on foreign currencies are translated into less dollars and a paper loss.

Lyet said, however, that "One down quarter doesn't lose the football game," and optimistically painted e bright Sperry future. The company plans to double revenue and more than double profit over the next five years, according to Lyet.

As part of the future plans, Lyet stated that nearly 10% of the estimated $2.5 billion to be invested in R&D will be allocated to computer technology. "From R&D flows the steedy stream of ideas, products and systems that assure us of e strong and growing place in our high-technology industries," Lyet told attendees.

According to the company's annual report, the Univac computer operations division accounted for 50% of Sperry's $5.4 billion annual revenue. In addition, the division increased its revenues 17% in fiscal '81, largely because of the four-year-old 1100/80 computer system, which brought in orders in excess of $500 million, Sperry noted.

"The computer industry continues to be one of the fastest growing businesses in the world. With each passing year the cost of processing information has gone down, the report noted. The company also praised its 1100/60 system, which it labels e "door opener," boasting e 70% first-time user order rate. Half of these orders replaced competitive systems and the other half were for epplications not yet computerized, the report said.

Reporting on the company's System 80, Sperry said that it hed set a division record for the highest initial order rate for e computer in its performance range. The company said that 73 System 80s will be installed across the nation by the U.S. Department of Defense for recruiting end personnel epplications, which reflects the largest single order for any major Sperry Univac system.

Although the company reported favorable results from its minicomputer market, Lyet said that the company has no plans to enter the personal computer field.

Sperry's board of directors raised the quarterly dividend by 9% to 48 cents per common share in June. This indicates en ennual rate of $1.92 per share.

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Aug. 17-20	ADF
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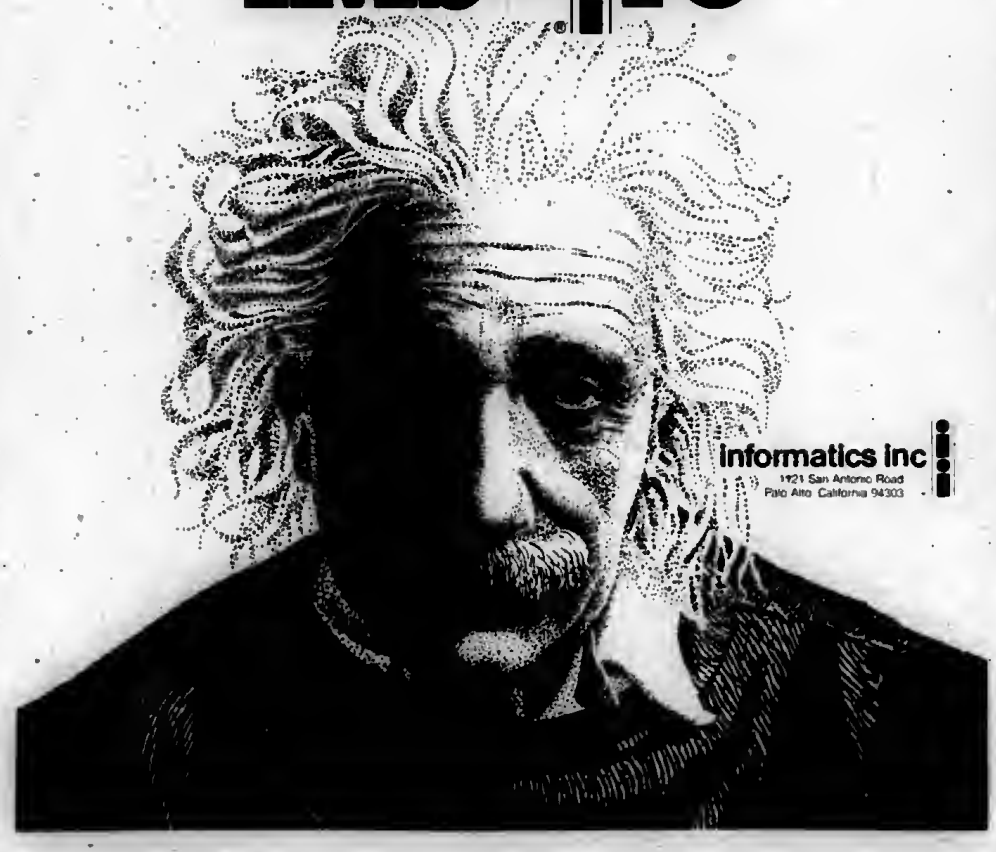

informatics inc
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Study Puts Industry R&D Outlay at $4.6 Billion

By Bohdan O. Szuprowicz
Special to CW

Despite gloomy predictions of the last few years that the U.S. is losing its technological lead in the world, a recent National Research Council study estimates that basic research in the U.S. nevertheless still accounts for about a third of all the research conducted throughout the world.

A *Business Week* survey of about 750 major corporations published in July 1981 indicates that a total of $28 billion was spent during 1980 on new product and process development, of which $4.26 billion represents research and development expenditures by about 60 leading companies in the information processing industry.

This is more than twice the amount spent by the aerospace industry in 1980 and only a shade under the $4.5 billion spent on R&D by the automotive industry, with General Motors Corp. and Ford Motor Co. the two top leading companies in R&D expenditures. Needless to say, IBM is the third largest R&D spender of them all; in 1980 more than $1.5 billion was spent by IBM for new products and process development, almost a third of all R&D expenditures in the information processing industry as a whole.

What this means, however, is that although IBM spends the most dollars on R&D in information processing, many of its competitors spend relatively even more to keep ahead of the data processing giant in several specialized product line markets.

This is dramatically illustrated when R&D expenditures of information processing companies are compared as percent of sales or on a per employee basis. In fact, among the 750 companies surveyed by *Business Week*, five of the top 10 R&D spenders on a percent of sales basis were information processing companies; and three of the top 10 who spent the most R&D dollars per employee were also from the information processing industry, but IBM was not among them.

Amdahl Corp. and Cray Research, Inc. are the top two leading R&D spenders in all industries on a percent of sales and dollars per employee basis.

Amdahl plowed back 15.8% of its sales dollars into R&D, resulting in $15,333 per employee, highest of all the companies surveyed in all industries. Cray came second with 14.5% of its sales going to R&D, which amounts to $11,521 per employee. By comparison, IBM spent only 5.8% of its sales revenues on R&D, amounting to about $4,545 per employee.

In fact, of the 68 leading information processing companies included in the survey, 33 spent a larger percentage of their sales on R&D than IBM, but only 17 of those were able to show a higher R&D expenditure per employee. This poses some interesting questions about manpower productivity and management capabilities among some of IBM competitors.

The big mainframe manufacturers such as Burroughs Corp., Control Data Corp., Honeywell, Inc., NCR Corp. and Sperry Univac all spent considerably less that IBM on a per employee basis, although in each case they spent a larger percentage of their sales dollar on R&D. Even the fast-moving Digital Equipment Corp. does not match IBM in R&D spending on a per employee basis, although almost 8% of its sales

(Continued on Page 66)

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Kalvar Corp. has signed a definitive purchase agreement to acquire the assets of the Micrographics Division of Washington Scientific Industries Corp. (WSI). Under terms of the agreement, Kalvar Corp. will pay WSI approximately $2.35 million for inventory, patents and related equipment.

Tymshare, Inc. has signed a letter of intent to acquire the business and operating assets of ITT Electronic Travel Services, Inc., a subsidiary of IT&T.

Mergers & Acquisitions

Saul Steinberg, chairman and president of Reliance Group, Inc. and Leasco Corp., and other members of the Steinberg family, have presented an offer of approximately $500 million to acquire all outstanding common shares of both companies.

Evans & Sutherland and Shape Data, Ltd. of England have reached a preliminary agreement under terms that will make Shape Data, Ltd. a wholly owned subsidiary of Evans & Sutherland.

Microcomputer Systems Corp. is in the process of acquiring Xebec Corp.

Misco Computer Services, Inc. has acquired Florida Computing Center, Inc.

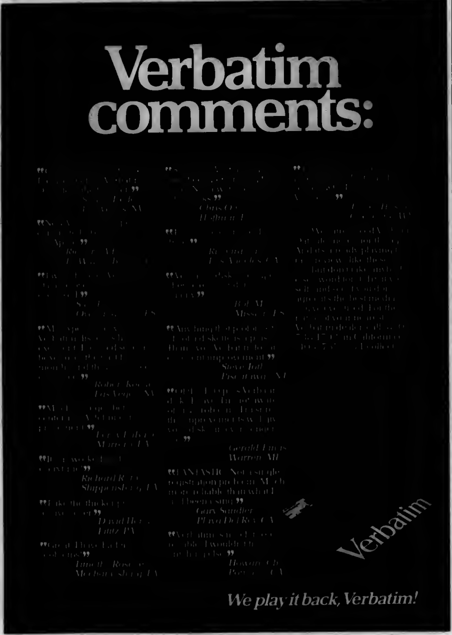
The 3M Co.'s Business Communications Products Division has acquired Trendcom Corp., which will become a 3M subsidiary.

Cubic Corp.'s Data Systems has acquired Aztec Computer Service, a division of the Ratner Corp.

Loral Corp. has completed the $11 million purchase of two Randtron Corp. subsidiaries, Randtron Systems, Inc. and Aercom Industries, Inc.

The First National Bank of Boston, acting through Randolph Computer Co., has completed acquisition of certain assets of Diebold Computer Leasing, Inc. for approximately $5 million.

Pentamation Enterprises, Inc. has announced the acquisition of Management and Computer Services, Inc.



Study Polls R&D Outlay

(Continued from Page 65)
go for that purpose. Data General Corp., with $4,568 spent per employee, is just about even with IBM on that basis, but the company spends as much as 10% of its sales revenues on R&D, almost twice as much as IBM.

Besides Amdahl and Cray, who are leading in R&D expenditures on a per employee basis, there are several highly successful companies in information processing that also spend considerably more than IBM on that score. The third largest spender of them all is Auto-Trol Technology Corp., with $9,277 spent per employee, amounting to 12.2% of their sales. Other big R&D spenders on a per employee basis include Apple Computer, Inc., Computer Consoles, Inc., Computervision Corp., Datapoint Corp., Floating Point Systems, Inc., Hewlett-Packard Co., Modular Computer Systems, Inc., Prime Computer, Inc., Shared Medical Systems, Inc., System Industries, Inc. and Tandem Computers, Inc.

Among the semiconductor manufacturers, Intel Corp. is the leader with $6,077 spent per employee, amounting to 11.3% of its sales dollar going to R&D. Intel also rates as the seventh largest R&D spender on a percentage of sales basis among the 750 companies surveyed, but overall, semiconductor companies, including Texas Instruments, Inc., spend less on R&D than IBM or even the major mainframe manufacturers. Perhaps this is why the Japanese are so confident of making rapid inroads in electronics and are threatening to match up and overtake the U.S. in this technological race.

Clearly, the R&D expenditures are a key factor in successful penetration and market share retention in this industry. But dollars alone do not tell the whole story. Management, manpower skills and productivity will ultimately make or break a company and the R&D expenditures related to these factors are good indicators where the future performance is likely to occur.

Supershorts

Genisco Computers Corp., formerly Genisco Computers Division of Genisco Technology Corp., has been established as an independent corporation with 20 million shares of authorized stock. Of this total, 6.2 million shares have been issued to Genisco Technology Corp., and an additional 1.7 million shares have been made available for issue to existing and future employees by Genisco Computers Corp. as part of an incentive program to retain and attract personnel.

— — —

Dicomed Corp. has separated its research and development function from its engineering function and has named new heads for each operation. John E. Grimaldi has become director of research and development and Neal Nordling has joined the company as manager of engineering.

— — —

Hewlett-Packard Co. plans to establish a new 165-acre facility in Bristol, England to manufacture advanced disk-memory devices and to serve as a research and development unit for future product design.

— — —

Telex Computer Products, Inc. has announced a marketing reorientation of all Series 8020 tape products and OEM tape products, placing them under one marketing division headed by Donald J. Wilson, president of the Peripheral/OEM Division in Tulsa, Okla.

— — —

Air Products and Chemicals, Inc. has pledged $315,000 over the next three years in support of Lehigh University's computer-aided design and manufacturing (CAD/CAM) program, which has been formed to develop and promote an integrated approach of progression from design to manufacture, with computer graphics providing the man/machine interface.

— — —

Zakar V. Zakarian has been named senior vice-president of market data and national market systems services at Securities Industry Automation Corp. and will be responsible for the planning, development and operation of the market data systems used by the New York and American Stock Exchanges, as well as the New York Futures Exchange.

— — —

Software House Users Group (Shugar), has been formed by software houses that supply programs for use on NCR Corp. processors and will hold its first annual conference at the Sugar Camp facilities at NCR corporate headquarters in Dayton, Ohio, Oct. 26 and 27. The purpose of this initial meeting is to provide a forum for both NCR and the group to exchange ideas for a better working relationship and to elect officers for the coming year. Details can be obtained by writing to Shugar, P.O. Box 4159, Tulsa, Okla. 74104.

— — —

Cipher Data Products, Inc. has launched a new distributor network to reach end-user and multiple-unit buyers who need magnetic tape drive peripherals in small quantities.

— — —

Televideo Systems, Inc. has established a nationwide small business computer distribution network with 4,200 dealers and a large national industrial distributor through which the company's single-user and multiuser computer systems will be available.

— — —

American Word Processing Co. has changed its name to Ameripro (American Information Products).

— — —

The National Council of Technical Service Industries has elected Dr. George A. Daoust Jr. executive director of the council, which is an association of 24 of the largest firms in the technical service field.

— — —

Wordshare, Inc. has expanded operations to include turnkey data processing hardware and software services as a result of its acquisition of FBM Systems, Inc.

— — —

Comdial Corp. has formed two subsidiaries in the U.S. and the UK to develop manufacturing and marketing efforts for its telephone terminal systems. The company has recently completed the initial semiconductor development phase for its proprietary electronic dialing systems that will be manufactured and marketed through the new subsidiaries.

— — —

Intel Corp. has expanded its end-user operation, called the Intel Systems Group, by opening an office in London. The new office address is Intel Corp. UK Ltd., Systems Group, 10 Barley Mow Passage, London, England W4 4PH.

— — —

Systems Engineering Laboratories, Inc. has shipped the first of its new Concept 32/87 computers to Electronic Associates, Inc. (EAI), to be used in an engineering hybrid computer being designed by EAI.

— — —

Innovative Computer Products Corp. recently shifted its sales direction from exclusively OEM sales to the establishment of a distributor and sales network to complement its OEMs.

Only IPL lets your 4300-range computer grow so big so fast. IPL System's 4400 Series is totally compatible with the 4300. It keeps pace with your growth requirements several ways. Plug-in circuit modules let you increase instruction execution rate, memory size and channel capacity at your own site. Without changing your basic cpu. The 4400 Series takes you from the performance range of a 4331-2 beyond the power of a 4341-2 through its ExpandaBus architecture. For more information, contact Paul Aborn at (617) 890-6620.

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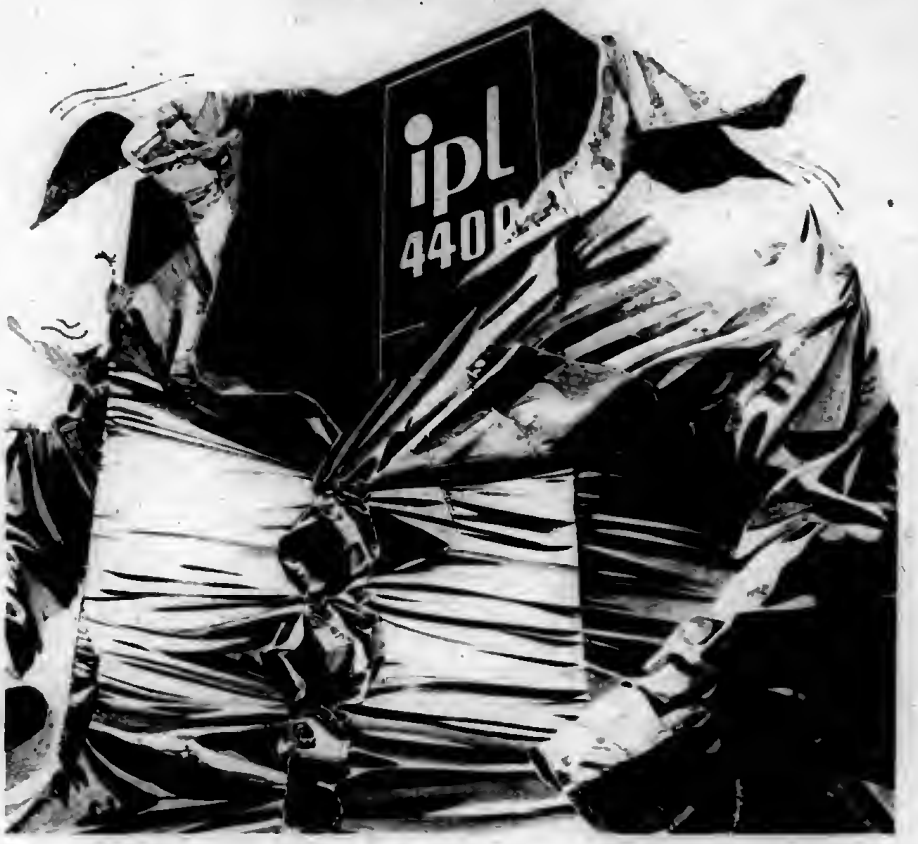

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- How to plan for growth

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October 5 (Day 1)

8:45–9:15 **Keynote**
A-1

9:15–9:45 **Coffee Break**

9:45–10:45 **Mini & Micro-Based**
A-2 **OEM Business Update**
a. Reagonomics.
b. Boon or bust.
c. Emerging trends.
d. How strong is the market 6–18 months out?
e. What are the new growth areas?
f. Market shifts in the next five years – what to expect.

9:45–10:45 **Industrial Dimensions**
A-3 **Panel**
a. Business structure: an overview of how most OEM's are structured today.
b. Varieties of OEMs for every market.
c. Vertical and horizontal opportunities – product and internal philosophy.

11:00–12:00 **OEM Survival Tools for**
A-4 **the 1980's**
The survival of an OEM depends upon the firm's ability to make a consecutive series of complex market decisions concerning what market segments to pursue, what product features to include and what sales strategies to employ. Many companies run into difficulties because these crucial decisions are opinion based rather than data based. This session introduces a number of simple, practical tools that every OEM can employ to more astutely analyze the marketplace and respond to its ever-changing demands.

11:00–12:00 **Acquisition and**
A-5 **Diversification**
Mergers and acquisitions: the viable alternative to corporate growth.
a. The pros and cons of merger vs. going public.
b. Why a company should consider merger and/or acquisition as a sound way to grow.
c. How to properly plan an orderly merger/acquisition program.
d. Why mergers/acquisitions help make a company more competitive in the marketplace.

12:00–1:30 **Luncheon**

1:30–2:30 **Influence of Growing Local**
N-1 **Networks (Part I)**
a. What's hot and why.
b. Where are we headed & what's the time frame?

2:45–3:45 **Influence of Growing Local**
N-2 **Networks (Part II)**

2:45–3:45 **Intelligent VDTs and Desk-**
N-3 **top Systems**
a. Impact as net elements.
b. Distributed data bases.
c. Can we do without a mainframe?

1:30–2:30 **Input/Output: Market &**
T-1 **Technological Structures**
a. Printers.
b. CRTs.

2:45–3:45 **Mass Magnetic Memory:**
T-2 **Market & Technological Structures**
a. Overview & future trends.
b. Floppy, Winchester & other disk memory.
c. Streamers vs. start-stop tape drives.
d. 64K bit/chip and beyond.

4:00–5:00 **Voice I/O and Other**
T-3 **Analogue I/O: Market & Technological Structures**
a. When do benefits equal cost?
b. Architecture examples.

1:30–2:30 **Retail Outlets**
O-1 a. What's the outlook?
b. Will the big boys dominate?

2:45–3:45 **Are You Ready for an**
O-2 **Ad Agency?**
a. Make or buy criterion?
b. Agency selection.
c. How you and your agency can best work together.
d. Where can consumer-level tactics work?

4:00–5:00 **OEM Agreements**
O-3 a. Franchise fees.
b. Sales territories, distribution rights.
c. Quotas, credit, payment.
d. Second sourcing protection.

1:30–2:30 **Application Generating**
S-1 **Tools**
a. Benefits of "user friendly" systems.
b. Increasing profits and productivity through the use of application generators.
c. Developing and marketing a system with an application generator as the nucleus.

2:45–3:45 **Software Management**
S-2 **Strategies**
a. Value added software development.
b. Documentation: Gaining a multiplier for software support.
c. Transportability: Controlling competitive influences.
d. 24 ways to improve turnkey software.

4:00–5:00 **Application Dynamics:**
S-3 **Planning for Changes**
a. Processor independent transportability.
b. Compatibility for expansion.
c. Holding down maintenance overhead.

1:30–2:30 **Microcomputer Trends**
P-1 a. 8, 16, 32-bit processors.
b. Trade-offs & time frame.
c. The effects of plummeting costs on high-level processors & high-capacity memory chips.
d. The near-term system of the future – 32-bit micro & 256K bit RAM chips?

2:45–3:45 **Legal Aspects of the**
P-2 **Third Party Market**
a. Legal aspects of OEM vendor arrangements from both the manufacturer and OEM perspectives.
b. Manufacturer, distributor, dealer, rep., final customer, who can get burned the most and what degree of protection is possible.

4:00–5:00 **Desk-top Computer**
P-3 a. Struggle for the right niche in a viper's nest of competition.

1:30–2:30 **IBM Watch**
C-1

2:30–2:45 **Coffee Break**

2:45–3:45 **HP Watch**
C-2

4:00–5:00 **TI Watch**
C-3

October 6 (Day 2)

8:30–9:45 **Japanese Vendors**
B-1 **"Meet the Press"**
Four Japanese vendors will be interviewed by editors from leading computer newspapers, business publications and financial journals about the growth of Japanese firms in the U.S. domestic markets.

9:45–10:15 **Coffee Break**

10:15–11:15 **Software: The Growth Area**
B-2 **of the Decade**
a. Market strategies.
b. Managing software projects: If you can't plan it, you can't do it.

10:15–11:15 **Financing Your Business**
B-3 **and Product Development**
a. How much money is needed to start and stay in business? Proformas?
b. Forecasting/budgeting.
c. Working capital/venture capital.

11:30–12:30 **Sales & Marketing Planning**
B-4 a. Main goal & objectives.
b. Common errors.
c. Key account strategies.
d. Distribution channel considerations.
e. External & internal organizational structures.

11:30–12:30 **The Service Alternative**
B-5 a. When does free consulting and service become a profit killer?
b. The OEM and the service questions. Is there a service requirement? Advantages and disadvantages to the OEM. Methods available to accomplish/solve service requirements.

12:30–2:00 **Luncheon**

2:00–3:00 **Europe as a Market**
M-4 a. Are you ready?
b. Is Europe ready for you?
c. Effective channels of distribution.
d. Marketing philosophies among countries.

3:45–4:15 **Beyond the European**
M-5 **Market: The Next Step?**
a. Best bets.
b. Update on the market.
c. Channels of distribution.
d. Maintenance and service.

2:00–3:00 **PR: The Unified**
U-4 **Corporate Philosophy**
a. Agency selection.
b. Developing the plan & positioning the product.
c. Press tours/conferences.
d. Releases.
e. Editor contact & the importance of personal involvement.

3:15–4:15 **Office Automation: One**
U-5 **Stepping Stone Beyond WP?**
a. Overview and future trends.
b. Strategies and techniques for OA equipment sales.

2:00–3:00 **Special ADAPSO Session**
P-4

2:00–3:00 **Sourcing Software**
S-4 a. An overview of the problem in today's market.
b. Make or buy? Realistic estimating of costs.
c. Evaluating packages for resale.
d. Evaluating a custom software house.

3:15–4:15 **Watering the Software**
S-5 **Desert**
a. Potentials of dealing with software publishing houses.
b. Alternatives in distributing software. Computer manufacturer programs to classified ads.

2:00–3:00 **DG Watch**
C-4

3:15–4:15 **DEC Watch**
C-5

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October 6, 1981
7:45–8:30 AM
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Honeywell, Inc. has increased the quarterly dividend on common stock to 85 cents a share, payable Sept. 14 to stockholders of record at the close of business Aug. 28.

$$$

IBM has declared a regular quarterly cash dividend of 86 cents per share on its common stock, payable Sept. 10 to stockholders of record as of Aug. 12.

Sycon, Inc. has filed a registration statement with the Securities and Exchange Commission for the proposed public offering of 2.5 million shares of common stock at $1 per share.

$$$

The Securities and Exchange Commission has initiated an administrative proceeding to determine whether to suspend the effectiveness of **CGA Computer Associates, Inc.'s** (CGA) recent registration statement. The commission has alleged financial statements filed by CGA did not fairly represent the company's financial position because the recent acquisition by CGA of Allen Services Co. should have been accounted for as a "purchase" rather than a "pooling-of-interest." CGA said it believes its accounting was appropriate.

$$$

NCA Corp. has filed a registration statement with the Securities and Exchange Commission for a proposed public offering of 570,000 shares of common stock, 360,000 of which will be newly issued shares to be sold by NCA, and the remaining 210,000 will be sold by certain selling shareholders.

$$$

Prodigy Systems, Inc. recently became a public corporation. The public issue was offered and completed by D. H. Blair & Co., Inc.

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Computer Network Corp. (Comnet) has announced that **U. S. Design Corp. (USDC)** has successfully concluded a public offering and sale of its stock, priced at $3 per unit (a unit equals one share of common stock plus one warrant), raising approximately $3.6 million after payment of all offering expenses. Comnet reported in its 1981 annual report an investment of approximately $335,000 for 223,424 shares in USDC, and that it also holds warrants expiring in mid-1986 for 599,637 additional shares of USDC stock at $2.25 per share.

$$$

Control Data Corp. has announced a two-for-one split of its common stock, subject to stockholder approval. The company also announced an 11% increase in the quarterly cash dividend of its common stock from 22.5 cents to 25 cents.

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The American Stock Exchange has approved for original listing 6,087,560 common shares of **Computer Consoles, Inc.**

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3550 N Central, Ste 1504
Phoenix, AZ 85012
(602) 264-6488

DALLAS

APL

Growth oriented company looking for career guided individuals. Must have APL programming experience. Salary depends on experience.

PROGRAMMER/ANALYST

Data center upgrading to the IBM 4300 Series. Looking for a min 2 yrs OS-COBOL and CICS. To $25,000

MINI'S

DataPoint; HP 3000; IBM Syst 3, 32, 34; and Burroughs. Have several excellent positions available. To $30,000

SR SYSTEMS ANALYST

Client has several positions available for individuals with at least 3 yrs DOS COBOL and CICS To $28,000

John Staiger
ROBERT HALF
of Dallas, Inc.
Two Northpark East, #750
Dallas, TX 75231
(214) 363-3300

LOUISVILLE

MGR TECH SUPPORT

Current manager of e tech support area with OS/MVS is what a Large corp MIS shop is seeking. Will control all systems programming except CICS. All relocations paid including home loan. Degree required.

Salary to $40,000

DATA BASE ANALYST

IMS is the key to opening a new career. Several openings exist for DBA positions with IMS, DL-1 background. Degree is only a plus not required.

Salary range $25-40,000

4300 SYSTEMS PROGRAMMERS

The most demanding product of the 80's is making the demand for DOS/VSE and OS systems programmers on 4300's at a skyrocketing level 1+ yrs. experience is all that is required.

Salary range $23-30,000

Tom Williams
ROBERT HALF
of Louisville, Inc.
900 South Fourth St.
Louisville, KY 40202
(502) 585-1751

NEW ORLEANS

ENERGY

Major international firms are seeking Prog/Analysts with E&P, construction, refinery or financial systems background. COBOL, RPG, NEAT 3 or PL1 exp. State of the art hardware and software shops. $20-35,000

Jane' Brown
ROBERT HALF
of New Orleans, Inc.
4539 One Shell Square
New Orleans, LA 70139
(504) 524-3773

PORTLAND

PROJECT MGR

Major client seeks 3-5 yrs expr as project leader-manager. Will install financial software packages & interface with user & supervise others. On-line expr required. MSA software installation expr helpful, but not mandatory.

Salary $25-30,000

SR PROG-ANALYST

Established banking firm seeks 4-7 yrs IBM-OS expr. Must have lead & project mgmt with IMS or other DBMS. Heavy user interface requires good communications skills.

Salary $22-28,000

Bob Clawson
ROBERT HALF
of Portland, Inc.
1 SW Columbia
Portland, OR 97258
(503) 222-9778

COLUMBUS

MGR OF BUSINESS SYSTEMS

Large national firm with growth opportunity for seasoned D P professional. 8-10 years industry experience with 2-4 years as S & P Mgr of Business Systems, and 2-4 years IMS project experience. A working knowledge of IMS is a must. Excellent benefits.

Salary $30-44,000

SR PROGRAMMER ANALYST-MFG

Develop and implement business information systems surrounding a manufacturing and assembly operation. 3+ years with DOS/VS Power job control, ANS Cobol, and CICS utilizing total data base. Degree preferred. Comprehensive benefits. Salary $23-27,000

Kurt Hopwood
ROBERT HALF
of Columbus, Inc.
88 East Broad St., Suite 1160
Columbus, OH 43215
(614) 221-8300

SAN ANTONIO

JR/SR TECHNICAL WRITER

Degree in related field with minor in English. Good oral and written skills a MUST plus overall knowledge of D P environment. Both level positions are for a visible and fast track company. $20-30,000

PROGRAMMER/ANALYST

Degree preferred not required. 2 plus yrs COBOL exposure with I/L, C/L appl (banking) experience a MUST. Burroughs shop but any hardware acceptable. Will lead to Sr level position. $20-24,000

SYSTEMS PROGRAMMER/MGR

Degree required, 8 plus yrs in D P with last 5 yrs in Sys/Tech area. IBM shop with DOS/VS/ VSE/Power CICS/ — on-line experience a MUST. System exposure is needed with Supervisory exp a PLUS to candidate. Company is growing and moving into new headqtrs in fall $30-35,000

PROGRAMMER

Degree not required. Good exposure and competent with COBOL & RPG II. Large or small mainframe accepted. Great starting place or intermediate level position. $17-22,000

All positions above and many more are in Texas, where "Long Necks", "Armadillos" and the "Cotton Eyed Joe" call home.

Bob Baldauf
ROBERT HALF
of San Antonio, Inc.
First International Bank Tower
Suite 6050
San Antonio, TX 78201
1-800-531-5402
In Texas Dial (512) 736-2467

TULSA

SR SYSTEMS ANALYST

Dynamic opportunity in Tulsa with oil and gas industry. Qualified applicant should have scientific applications, exposure to DEC, & VMS. Outstanding growth with aggressive management team. Anxious! $30,500

ROBERT HALF
of Oklahoma, Inc.
5840 S. Memorial Drive
Suite 217
Tulsa, OK 74145
(918) 627-1600

MILWAUKEE

SYSTEMS SOFTWARE ANALYST

Have you touched the outer limits of your ability? This progressive & prestigious company needs your DOS/VSE Systems Generation and maintenance experience to assist them in their migration to a MVS operating environment. DBMS or IDMS a plus. $30-36,000

PROGRAMMER/ANALYST

This is more than a job — this is a future. Bring your strong COBOL, CICS & analytical experience together in this perfect environment in which to meet your future goals. DOS, VM, VSAM are additional requirements. $24-28,000

Larry Lapotine
Richard Bird
ROBERT HALF
of Wisconsin, Inc.
777 E. Wisconsin Avenue
Milwaukee, WI 53202
(414) 271-HALF (271-4253)

SOUTHERN CALIFORNIA

LOS ANGELES

SR PROGRAMMER ANALYST

Fortune 500 Division located in Southern California seeks a creative, resourceful, and stable Sr P/A for its IBM 3033-MVS/SP1, IMS, CICS, TSO/SPF shop. Requires 3+ years of OS-COBOL in financial or insurance applications. IMS or CICS preferred. Exceptional benefits include extensive in-house career development and flexible hours. Fee paid. To $32,000

Ajay Berry
ROBERT HALF
of Los Angeles, Inc.
3600 Wilshire, Suite 3000
Los Angeles, CA 90010
(213) 386-6805

ORANGE COUNTY

NEW PORT BEACH

MIS CONSULTANT

Major international CPA firm has super opportunity in their consulting group for poised, action oriented individual with strong technical background, good communication skills and 2+ yrs exp. Degree required. Fee paid To $30,000

Al Handler
ROBERT HALF
of Orange County, Inc.
2323 N. Broadway, #200
Santa Ana, CA 92706
(714) 835-4103

COMMERCE

SR PROGRAMMER/ANALYST

To act as Assistant Manager in system 38 shop. Self-starter with a degree and 3+ years RPG/Manufacturing. Fee paid To $32,000

Bob Dack
ROBERT HALF
of Los Angeles, Inc.
6252 E. Telegraph
Commerce, CA 90040
(213) 721-2197

ATLANTA

PROGRAMMER/ANALYST

If you are a COBOL programmer with general applications, experience and exposure to a Harris, or Mini Systems, ANSI or A 27, you could be headed for management in this challenging spot. $22,000

SYSTEMS ANALYST

Experience with Database design with DL/1 and IMS is what is needed to join a growing firm servicing Insurance Companies with first rate data processing. Creative atmosphere and growth accompany this position. $27,000

ASSEMBLER PROGRAMMER

Two or more years in heavy BAL COBOL Assembler at CICS MACRO level is an on-line OS/DOS environment is what a well-known Software Development firm is looking for. Top-notch shop with excellent benefits. Will train a good BAL PROGRAMMER in CICS $35,000

Ellen Wallin
ROBERT HALF
of Atlanta, Inc.
3379 Peachtree Rd. N.E.
P.O. Box 10201
Atlanta, GA 30329
(404) 266-2153

BALT / WASH / RICHMOND

MANAGER DATA COMMUNICATIONS

Major Washington, DC data processing firm seeks talented individual for growth position at local headquarters. Must have solid CICS/teleprocessing background. Expanding IBM environment. Outstanding benefits package. To $35,000

ROBERT HALF
of Baltimore, Inc.
217 The Quadrangle
Baltimore, MD 21210
(301) 323-7770

ROBERT HALF
of Washington, Inc.
7316 Wisconsin Ave.
Washington, DC 20014
(301) 652-1900

ROBERT HALF
of Richmond, Inc.
530 E. Main Street
Richmond, VA 23219
(804) 648-3877

KANSAS CITY

MANAGER TECH SUPPORT

Progressive Mid-western manufacturer seeks an aggressive Systems Programmer to take over management of their technical growth. Must be familiar with DOS/VSE, VM, Data-base, distribute processing, and hardware evaluation. Environment consists of a 370/158 under VM with a 4341 under DOS/VSE with a distributive network of Series 1 and 5100's. Salary to $40,000

HARDWARE ANALYST

Major midwestern energy firm with major mainframe corporate data center supporting distributor of data processing requires a hardware analyst. Must be capable of installing mini-computer and mainframe hardware, environmental support, building facility construction, hardware evaluation and ordering, mini-computer change activity, computer failure impact analysis, disaster recovery planning and hardware problem resolution. Person will help plan and direct the corporate's five year hardware and software plan. Degree required. Salary to $30,000

SR MIS PLANNER

Newly created corporate planning function seeks an experienced MIS Planner. Become immediately involved in long range planning, feasibility studies and project planning. Prior experience in large scale systems and hardware evaluation required. Good verbal and written communications skills a must. Excellent visibility to major corporate exec's with promotion possibilities throughout the whole corporation. Salary to $35,000

PROGRAMMER/ANALYST

Join this newly forming project team and be in on a ground floor design of the total system. Two years of COBOL programming in either an OS or DOS/VS environment qualifies. Be trained in the latest Warnier-Orr techniques. Excellent promotion possibilities Salary to $28,000

George Waterman
ROBERT HALF
of Kansas City, Inc.
127 W. 10th
Kansas City, MO 64105
(816) 474-5563

ROBERT HALF

BOSTON

SYS & FROG MGR

Respected mfr seeks proven mgr with leadership abilities to direct all sys activities. IBM 4331 DOS/VSE, CICS, DL-1, COBOL environ. Growing staff with ambitious on-line sys devel plans make this an extraordinary career oppty.
Salary $38,000

MFG SYSTEMS MGR

Distinguished consumer goods mfr near Cape Cod req mfg apps specialist to supv devel staff of 19. IBM OS, CICS, DBMS facility. Direct access to VP mfg & exec steering committee. Exciting growth oppty.
Salary $37,000

DOS SYSTEMS PROG

Progressive computer svcs firm seeks heavyweight internals expert for IBM 4341 environ. Will spearhead VS to VSE upgrade & expand CICS network to 200 local & remote terminals. Salary $33,000

EDP AUDITOR

Prominent mfr seeks indiv with software QA exp to estab EDP audit function. Environ incl both main-frame & mini computers with hvy DBMS & on-line systems. Will build & manage own staff. Salary $32,000

HONEYWELL CONSULTANT

Highly respected software serv firm seeks tech strong indiv for diverse client engagements. H-6000, IDS-1 & 2, COBOL 68/74 bkgrd pref. Highly stimulating DBMS & TP devel projs. Freq merit bonuses.
Salary to $30,000

SR COBOL PROGRAMMER — NH

Expanding DP serv firm req bright indiv for devel projs in hvy user environ. BURROUGHS medium or large sys bkgrd pref but not req. Exceptional learning oppty in picturesque setting. Salary $25,000

PL-1 PROG/ANALYST

Internal known healthcare org req industrious indiv for major sys projs. IBM 370, CICS/VS environ. Join ind ldr & staff with superior tech depth.
Salary $24,000

Gerry Bettiste
ROBERT HALF
of Boston, Inc.
100 Summer Street
Boston, MA 02110
(617) 423-1200

DAYTON

MFG PROG/ANAL

Texas gas & oil firm seeks communications candidate at any level of experience (at least 1 yr). Your IBM prog bkgrd qualifies you for this outstanding oppty in the southwest's most progressive data processing facility! Gain knowledge of data base and telecommunications! Call immediate openings! Fee paid.
$20-50,000

SOFTWARE CONSLT

Midwest fin'l data center seeks your System Prog knowledge for specific positions in following areas: IMS, MVS, CICS, ACP, NCP, TCAM. We'll set up direct phone interview. Benefits astounding. Fee paid.
$30-45,000

David Spyridon
Linda White
ROBERT HALF
of Dayton, Inc.
One First National Plaza
Dayton, OH 45402
(513) 224-0600

PROVIDENCE

MIS DIRECTOR

Prominent RI mfr seeks top-notch sys "pro". Prior MIS Director bkgrd in mfg environ req. Proven tech & admin skills. MBA pref.
Salary range $40,000

DATA BASE SPECIALIST

Fortune 500 co seeks sys specialist w/in-depth IMS DB/DC exp + solid bkgrd in Batch & on-line appls analysis. Mfg appls a +. Project leadership resp. Salary to $36,000

DOS SYSTEMS PROGRAMMER

Rapidly growing mfr desires exp in tech support. 5+ yrs DP bkgrd with at least 2 yrs DOS sys prog IBM 4331-2 with CICS. Installing DOS/VSE Release 2.
Salary to $30,000

SYSTEMS ANALYST

RI Blue Chip svcs org seeks sr sys analyst with exp in lge scale sys design & impl. Hvy user interaction & proj mgmt resp. Coordinate user & DP resources. Salary range $25,000

DL/1 ANALYST

Major consumer prod mfr desires sr prog/analyst w/strong DL/1 & COBOL skills. Min 3 yrs mfg appls knowl req. Fin'l & mfg appls develop. IBM 4341 environ.
Salary range $23,000

Bob Lathrop
ROBERT HALF
of Providence, Inc.
400 Turks Head Bldg.
Providence, RI 02903
(401) 274-6700

TAMPA

SYSTEM ANALYST

One of Florida's largest data center — state-of-art needs IMS-Cobol-MVS
To $27,000

PROG/ANAL

Expansion created this one 370/DOS/Cobol/CICS — Macro or command. $26,000

SYS PROG

DOS/VS/CICS — assembler and Cobol — Super potential — 43XX or 370. $25,000

MGR SYS & PROG

Major Florida corp has need for real pro — DOS/VS/CICS mfg for acctg appl. Must have good track record. $28-32,000

PROG/ANAL

Large public corp needs two who have IBM DS or MVS Cobol CICS — Any DBMS
$18-23,000

Stan Allen
ROBERT HALF
of Tampa, Inc.
1311 N. Westshore Blvd.
Tampa, FL 33607
(813) 878-4181

JACKSONVILLE

PROGRAMMER/ANALYST

Leading local financial institution is seeking top professionals with 2+ yrs exp. Background must include COBOL and Assembler on a 370/158 OS/VS1 System. Financial applications is a definite plus. Complete relocation package offered. Fee paid. Salary $20-24,000

ROBERT HALF
of Jacksonville, Inc.
9650 Regency Square Blvd.
Suite 213
Jacksonville, FL 32211
(904) 721-0970

HARTFORD

CORP SYSTEMS

Outstanding oppty for order entry sys ana'yst with mini bkgrd to design & impl distribution sys for progressive Conn corp. Salary to $35,000

MGR OF OPERATIONS

Ground floor oppty for exp'd operations supvr with IBM or UNIVAC bkgrd to manage all training, security & hardware planning for Conn shoreline co.
Salary to $30,000

TECH CONSULTANT

Outstanding New Eng based corp. 2 to 3 yrs COBOL + strong desire for more tech orientation to act as liaison between app areas & tech support function. Solid user skills mandatory. IBM 370, 3033.
Salary to $30,000

CICS TRAINING

Nat'ly known Cent Conn mfg firm will train talented, exp'd OS COBOL prog with IBM 370, 3033 or similar exposure. Degree mandatory. Min 2 yrs COBDL. Visible role.
Salary to $25,000

INSURANCE SYSTEMS

Conn Ins co expanding Life, Group sys development staff. Exp in COBOL with excellent user skills qualify for promotable oppty's.
Starting salaries to $30,000

DIST'D PROCESSING

Conn oppty for indiv with exp in perf evaluation of remote processing systems, i.e. IBM 8100, 3790, 3270, etc. Networking exp pref.
Salary to $30,000 +

TECH PROG

Conn client expanding on-line systems dev. Exp in COBOL appl's using IMS or CICS req for multiple oppty's.
Salaries to $28,000

Stan Durbas
Paul Meisner
Carol Wilson
ROBERT HALF
of Hartford, Inc.
111 Pearl Street
Hartford, CT 06103
(203) 278-7170

MIAMI

SYSTEMS DESIGNER

In a dead-end job? Excellent career opportunity with Miami-Based Latin American Division of Fortune 500 Corporation. Ideal candidate must be degreed and have on-line financial systems design background, including strong knowledge of CICS/ADABAS. This is your chance for involvement in IBM state-of-the-art environment. Relocation paid.
Salary to $29,000

Bonnie Gouz
Chuck Nell
ROBERT HALF
of Miami, Inc.
1395 N.W. 167th Street
Miami, FL 33169
Dade (305) 625-5433
Broward (305) 764-1550

MEMPHIS

PROGRAMMER/ANALYST

If you are #2 and ready to be #1, we can help you relocate to the Sunbelt with all expenses paid. Call collect (901) 683-5621. Ask for Judy. All fees paid by company.

ROBERT HALF
of Memphis, Inc.
825 Ridge Lake Blvd.
Memphis, TN 38119
(901) 683-5600

BUFFALO

MIS MANAGER

Roch based mfg co needs well-rounded sys "pro" to take charge of increasing staff. Ideal bkgrd incl min 7 yrs planning & supv dp ctr + design & impl exp, preferably in mfg sys environ. Lge scale IBM a must.
Salary $35,000

PROGRAMMER ANALYST

Sophisticated IBM installation loc in Western NY needs COBOL prog with mainf & scratch programming exp. Fin'l/banking bkgrd ideal for this employee oriented, career oppty. OS & CICS pluses.
Salary $25,000

DATA BASE ADMIN

Newly formed data base area is presently implementing IDMS. Logical data base design exp desired. Hvy analysis & user interface musts. Hi visibility pos will lead to mgmt.
Salary $33,000

SYSTEMS SOFTWARE SUPVR

Highly tech sys dept needs supvr with up thru the ranks record. Will manage software prog staff resp for OS/VS1 SYSGENS, IMS, capacity planning & performance measurement. Bkgrd must incl hi-level lang. Multi-plant mfg co loc in Central NY will be converting to MVS BS. Salary $40,000

PROGRAMMER ANALYST

Min 2 yrs COBOL exp will qualify for this expansion pos. State-of-the-art IBM 4331 installation needs prog with CICS bkgrd. Multi-plant mfg co has proven track record in internal promotion. Outstanding peer group. Salary $23,000

Pam Siegel
ROBERT HALF
of Buffalo, Inc.
1310 Liberty Bank Bldg.
Buffalo, NY 14202
(716) 842-0801

ALBUQUERQUE

IBM

Leading Albq shop with latest state-of-the-art. Resp for fine tuning and performance measurement. DOS/VSE in COBOL/JCL. Start $30,000

SYS 34

Career position in New Mexico, from DP-Managers to Analysts to Programmers. Requires hands-on exp with RPG.
Start $22-30,000

Dick Starnes
ROBERT HALF
of New Mexico, Inc.
P.O. Box 3320
Albuquerque, NM 87190
(505) 884-4557

GREENSBORO

PROGRAMMERS

Blue chip company seeks progs with 1 yr Cobol or large IBM. Any CICS a big plus.
To $21,000

SYS PROGS

Several positions IBM DOS, OS, MVS & DEC. To $33,000

SYS ANALYST

Expanding Fortune 100 state-of-the-art shop is hiring anals with IMS Cobol MVS.
To $30,000

Larry Brooks
ROBERT HALF
of North Carolina, Inc.
Wachovia Bldg., Suite 1117
Greensboro, NC 27401
(919) 274-2448

NEW YORK

RPG II
SYS 34

You'll get a chance to prove how good you are in this highly professional environment. 1+ years SYSTEM 34 and 3+ years RPG II interactive! with strong user interface and design experience. Aid in design through implementation of interactive applications. If you're good you'll move up fast. $32,000

COBOL
HP 3000

Ground floor opportunity for technically oriented pro. 2+ years COBOL programming and strong HP 3000 experience. Aid in development of all commercial applications on newly installed HP 3000. Realistic growth potential in rapidly growing environment. $30,000

ICL
COBOL

Exciting opportunity with this progressive entertainment conglomerate. 2+ years COBOL programming with on-line experience. ICL experience is a definite plus. Responsible for development and enhancements of financial applications. Outstanding benefits and pleasant working atmosphere. $30,000

FORTRAN INVESTMENT

Dedicated professional needed to work in career oriented environment. 3+ years FORTRAN programming with investment applications experience. Time-sharing experience is a definite plus. Develop systems for management of 3 billion dollar portfolio. Worthwhile. $27,000

FORTRAN
PRIME MINI

Interesting and involved responsibilities in conversion from manual systems. 1+ year FORTRAN programming with commerical applications experience and good oral and written skills. Develop applications in Prime 550 mini environment. $22,000

OS COBOL
MVS TSO

Diversified responsibilities will keep even the most hard to please individual satisfied. 3+ years OS COBOL programming with analysis experience and good oral and written skills. Applications are financial with plenty of user interface. Professional working atmosphere.
$31,000

COBOL
LEARN CICS

Ground floor opportunity with well-known firm converting from batch to on-line. 2+ years COBOL programming with commercial applications experience. Environment is 4331 DOS/VSE going to CICS. Company will train in CICS. Highly visible with room for growth.
$30,000

ON-LINE SPECIALIST

Highly visible with growth-minded management team. 3+ years CICS and TASKMASTER with good oral and written skills and COBOL programming experience. Aid in development of ON-LINE applications on 9341 IDMS. Highly visible with room for growth. $40,000

Marty Amato
ROBERT HALF
of New York, Inc.
522 Fifth Avenue
New York, N.Y. 10036
(212) 221-6500

DENVER

PROJECT LEADER

Prominent Denver oil and gas exploration/production company seeks an individual with strong financial applications experience. Co-ordinate between user and service bureau. Person should be able to supervise several projects simultaneously.
Start $35-40,000

SYSTEMS ANALYST

Ideal oppty for an individual with CICS/TSO business applications and design experience. Person will be developing backup system for all corp DP operations. Position located in southern Colorado suburb. Definite advancement position.
Start $28,000 range

ROBERT HALF
of Denver, Inc.
2 Park Central
Denver, CO 80202
(303) 629-1010

FORT LAUDERDALE

SYSTEMS/PROGRAMMER

Prestigious financial services company going through unprecedented growth is expanding their software group. They require a talented pro with expertise in MVS/JES-2 internals or CICS/ACF VTAM experience in an IBM 3033 environment. Tremendous upward career path and benefits package. All positions fee paid.
Salary to $35,000

Rick Pitman
ROBERT HALF
of Ft. Lauderdale, Inc.
7770 W. Oakland Park Blvd.
Suite 410
Ft. Lauderdale, FL 33321
(305) 742-0200

SEATTLE

Large Seattle firm expanding staff seeks several prog/analysts with 1 to 5 years CDBDL experience in IBM 370/303X OS shops. IMS, CICS background a plus.
To $24,000

Anchorage Alaska bank seeks experienced IBM OS Assembler and COBOL applications prog/analyst. To $32,000

Ray Magill
ROBERT HALF
of Seattle, Inc.
600 University St. #2328
Seattle, WA 98101
(206) 624-9000

CHICAGO

MANAGER

Excellent opportunity for System 34 RPG 1 Programmer/Analyst who is ready to manage. Hands on responsibility for developing new on-line accounting systems. Supervise small staff. $35,000

George Thomas
Tom Flores
Bob Hendrix
ROBERT HALF
of Chicago, Inc.
35 E. Wacker
Chicago, IL 60601
(312) 782-6930

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Los Alamos National Laboratory is seeking an operating system software specialist to participate in improving our system's service to users. The incumbent will:

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- experience with other operating systems will be evaluated as to its applicability to this position.

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Charles Mikkelson
DIV 81-CA
Los Alamos National Laboratory
Los Alamos, New Mexico 87545

Los Alamos

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SENIOR PROTOCOL ENGINEERS

The Government Systems Division of WESTERN UNION TELEGRAPH COMPANY has "Once in a Lifetime" opportunities for you if you are an innovative professional with education and experience in Computer Science, Electrical Engineering, Mathematics, or Software Engineering.

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- PDP 11 Series System
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western union

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Government Systems Division
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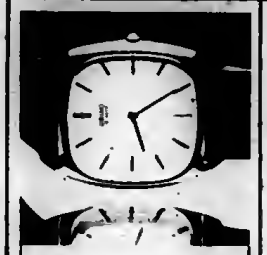

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SR. PROGRAMMERS/PROGRAMMERS: 1½ to 3 years experience. Familiarity with OS/JCL, IBM utilities including TSO/SPF. CICS and VSAM experience are required for senior level positions.

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ADR

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Final filing date: Aug. 24, 1981, 5:00 p.m.

Send resumes to:

James Morris, Project Manager
Division of Information Systems
California State University, Fresno
Fresno, CA 93740

or call:
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Our equipment includes an IBM 370/135 under DOS/VS using WESTI telepromessing software. An IBM 4341 is scheduled for installation.

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MARTIN MARIETTA

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The Mining Tool Group of Kennametal is headquartered at Bedford—an historic, attractive little town nestled in the Allegheny Mountains of south central Pennsylvania. At your back and call are cool, green forests and sparkling mountain streams in the summer—and ski slopes in the winter. Minutes from the turnpike. Easy access to Baltimore, Washington, Pittsburgh, Harrisburg, and Philadelphia.

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Overall responsibility will include directing the scheduling and operation of all production activities associated with computer processing in a manufacturing environment. You will be responsible for: a computer facility which provides both on-line and batch processing service, establishing and enforcing standards for controlling work flow, evaluation and installation of new equipment to meet constantly changing user requirements.

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Provide technical support in all phases of systems application programming design ... as a member of a team analyzing, developing and designing information systems for our financial organization.

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Programmer/Analyst (Technical)

Provide technical support in all phases of systems applications programming and design including database planning and application; and analysis, design and development of information systems.

Position requires a B.S./B.A. degree in Business, Computer Science or related field or equivalent, 3-5 years of experience in data processing, and experience with DMS, TOTAL, IDMS, CODASYL, and database.

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We offer an excellent income commensurate with your experience and a generous benefits package. For immediate and confidential consideration, please forward your resume with salary history to:

Dept. R

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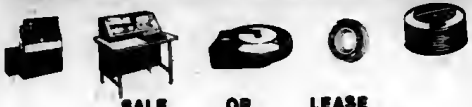

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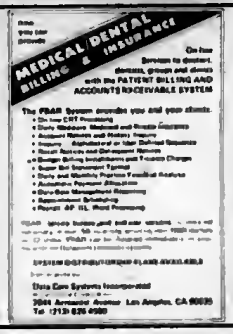

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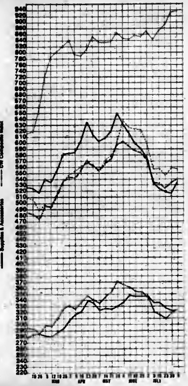

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Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, AUGUST 5, 1981

All statistics compiled, computed and formatted by TRADE QUOTES, INC. Cambridge, Mass. 02139

EXCH		1980-81 RANGE (1)	CLOSE AUG 5 1981	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
O	AMDAHL CORP	18- 43	38	+4 8/8	+14.7
N	BURROUGHS CORP	35- 38	35 3/8	-1 5/8	-4.3
O	COMPUTER AUTOMATION	8- 27	18 3/4	- 1/2	-0.7
N	CONTROL DATA CORP	35- 84	74 3/8	+5 1/4	+7.0
O	CRAY RESEARCH INC	18- 48	34 1/4	+ 5/8	+1.8
N	DATA GENERAL CORP	48- 87	88 1/4	+3 1/4	+8.7
N	DATAPOINT CORP	22- 88	54 1/4	+8 8/8	+5.0
N	DIGITAL EQUIPMENT	52-118	87 8/8	+2 7/8	+3.0
A	EECO INC	8- 18	10 1/8	- 1/2	-4.8
N	ELECTRONIC ASSOC.	8- 12	7	0	0.0
N	FOUR-PHASE SYSTEMS	18- 48	33 7/8	+1 1/4	+3.8
N	FOXBORO	81- 82	47 1/8	+ 1/8	+0.2
O	GENERAL AUTOMATION	7- 18	12 1/8	+1 1/4	+11.4
O	GRI COMPUTER CORP	1- 8	1 1/4	0	0.0
N	HARRIS CORP	25- 30	48 1/4	+2	+4.8
N	HEWLETT-PACKARD CO	22- 54	48 1/4	+3 1/8	+8.7
N	HONEYWELL INC	85-113	80 1/4	+5	+5.8
N	IBM	50- 78	58 8/8	+3	+5.4
O	MAGNUSON COMP SYSTS	18- 48	18 3/4	+ 3/4	+3.8
N	MANAGEMENT ASSIST	8- 25	14 1/8	- 8/8	-4.2
O	MINI-COMPUTER SYST	1- 8	1 3/4	0	0.0
N	MODULAR COMPUTER SYS	8- 01	11 1/8	- 3/8	-3.2
N	MOHAWK DATA SCI	10- 31	17 8/8	+1	+8.0
N	NCR	52- 82	58 1/2	+2 1/8	+8.7
N	PRIME COMPUTER INC	10- 48	28 3/8	+3 1/2	+14.0
N	PERKIN-ELMER	13- 35	23 3/8	+ 2/4	+8.0
N	SPERRY CORP	40- 83	41 7/8	+1 8/8	+3.8
O	TANDEM COMPUTERS INC	18- 38	31	+1 1/2	+8.6
N	TEXAS INSTRUMENTS	78-108	88 5/8	+2 3/4	+2.8
A	WANG LABS.	17- 80	81	+2 1/2	+8.7
	LEASING COMPANIES				
O	BOOTHE FINANCIAL CP	13- 27	28	+ 1/4	+0.8
N	COMDISCO INC	8- 24	21 3/4	- 1/4	-1.1
A	COMMERCE GROUP CORP	1- 2	1 1/4	0	0.0
A	COMPUTER INVSTRS GRP	1- 4	8/8	0	0.0
O	CONTINENTAL INFO SYS	2- 10	8 1/7	+ 1/8	+6.2
A	DCL INC	3- 8	8 8/8	0	0.0
N	DPF INC	5- 12	8 8/4	+ 3/4	+8.8
O	ITEL	1- 10	7/8	- 1/8	-12.5
O	LEASPAC CORP	1- 2	8/8	0	0.0
A	PIONEER TEX CORP	2- 8	3 1/2	- 1/4	-4.3
N	RELIANCE GROUP INC	24- 88	38 3/4	+1 1/2	+1.0
N	U.S. LEASING	12- 30	22	+ 5/8	+2.8

EXCH		1980-81 RANGE (1)	CLOSE AUG 5 1981	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 8	8 3/8	- 1/8	-2.2
O	ADVANCED SYSTEMS INC	10- 18	10 1/4	- 1/4	-2.3
O	ANACOMP INC	8- 18	18 1/8	+ 1/8	+0.8
O	ANALYSTS INTL CORP	3- 14	8	0	0.0
A	APPLIED DATA RES.	8- 25	17 3/4	- 7/8	-4.8
N	AUTOMATIC DATA PROC	15- 32	30 1/4	- 1/4	-0.8
O	CGA COMPUTER ASSOC	7- 17	8 8/4	- 1/2	-5.8
O	COMPUTER HORIZONS	1- 8	2	0	0.0
O	COMPUTER NETWORK	4- 8	4 7/8	- 1/8	-2.8
N	COMPUTER SCIENCES	11- 30	17 5/8	+ 5/8	+3.8
O	COMPUTER TASK GROUP	1- 23	10 1/4	0	0.0
O	COMPUTER USAGE	2- 10	2 3/4	0	0.0
O	COMSHARE	11- 21	12	+ 1/2	+4.3
O	CULLINANE DATABASE.	18- 28	38	+1 1/2	+2.7
O	DATA DIMENSIONS INC	1- 8	1 3/8	0	0.0
O	DATATAB	1- 4	2 7/8	+ 1/4	+8.8
O	DBI CORP	4- 8	8 7/8	- 1/8	-8.8
O	DYATRON CORP	4- 11	8	- 1/4	-4.0
N	ELECTRONIC DATA SYST	10- 30	28	+2	+7.0
O	INFORMATICS INC	9- 33	22 1/2	+1	+8.8
O	INSYTE CORP	1- 3	2 1/4	0	0.0
O	IPR COMPUTER MARKET.	1- 4	1 3/4	0	0.0
O	KEANE ASSOCIATES	3- 8	8 1/2	0	0.0
A	LDAICON	12- 28	28 8/4	- 5/8	-2.0
O	MGMT SCI AMER INC	17- 20	18 3/4	- 1/4	-1.2
O	MATHEMATICA INC	8- 18	14 3/4	0	0.0
O	MATHEMATICAL APP GRP	7- 33	20	-1	-4.7
O	NATIONAL DATA CORP	8- 27	20 3/8	+ 3/4	+3.8
N	PLANNING RESEARCH	5- 13	8 1/2	0	0.0
O	PROGRAMMING & SYS	1- 2	1 7/8	+ 1/8	+7.1
O	RAPIDATA INC	4- 11	7 1/2	- 1/8	-1.8
O	REYNOLDS & REYNOLDS	18- 34	81 3/4	+1 1/4	+8.8
O	STMC INC	8- 28	18 1/2	-1 3/4	-10.1
O	SCIENTIFIC COMPUTERS	3- 17	8	+ 1/4	+2.8
N	TYMSHARE INC	17- 38	28 1/4	-8 8/8	-15.8
A	URS CORP	5- 17	14 1/8	+ 1/8	+0.8
N	WYLY CORP	4- 20	10 8/8	- 7/8	-7.8
	PERIPHERALS & SUBSYSTEMS				
N	AM INTERNATIONAL	11- 24	12 5/8	0	0.0
A	ANDERSON JACOBSON	8- 25	17 3/4	+ 1/8	+0.7
O	AUTO-TROL TECHNOLOGY	13- 62	10 1/4	-1	-7.0
O	BEEHIVE INT'L	2- 10	11 1/2	- 1/2	-4.1
A	BOLT,BERANEK & NEW	8- 25	18 3/8	+1 1/2	+8.3
N	BUNKER RAMO	17- 28	24	0	0.0
O	CAMBEX CORP	1- 8	5 1/8	- 1/4	-4.8
N	CENTRONICS DATA CORP	10- 35	10 3/8	-1 2/4	-14.4
A	CETEC CORP	3- 8	8 3/8	- 3/8	-8.2
O	COMPUTER DEVICES INC	5- 10	7 1/4	+ 3/8	+6.4
O	COGNITRONICS	1- 11	8 1/8	+ 7/8	+12.8
O	COMPUTER COMMUN.	1- 10	2 1/8	0	0.0
O	COMPUTER CONSOLES	4- 37	24 2/8	-2 3/8	-8.8
O	COMPUTER TRANSCEIVER	1- 8	7 3/4	+1 1/8	+10.8
N	COMPUTERVISION CORP	18- 48	42 3/4	+4 1/4	+11.0
N	CONRAC CORP	13- 07	23 8/8	+ 8/8	+1.4

EXCH		1980-81 RANGE (1)	CLOSE AUG 5 1981	WEEK NET CHNGE	WEEK PCT CHNGE
A	DATA ACCESS SYSTEMS	8- 23	7 3/8	- 1/8	-1.8
A	DATAPRODUCTS CORP	11- 44	28 1/4	+ 8/8	+0.1
O	DATUM INC	8- 5	2 3/4	+ 1/8	+4.7
O	DECISION DATA COMPUT	8- 8	4	+ 1/2	+14.2
O	DELTA DATA SYSTEMS	1- 4	8	- 1/2	-14.2
O	DATARAM CORP	8- 37	7 1/4	0	0.0
N	ELECTRONIC M & M	3- 8	4 1/2	0	0.0
O	EVANS & SUTHERLAND	7- 38	38 1/2	+ 1/2	+1.8
O	FABRI-TEK	1- 8	4 1/8	+ 1/8	+3.1
O	GENERAL COMPUTER SYS	1- 12	7 3/4	0	0.0
O	GEN'L DATA COMM IND	8- 22	11 1/4	- 1/8	-1.0
O	GENERAL TERMINAL CP	1- 4	1 3/8	- 1/8	-8.3
N	HAZELTINE CORP	10- 32	88 1/2	+ 1/8	+0.4
O	INFORMATION INTL INC	8- 17	13	+ 1/4	+1.8
O	INTEL CORP	23- 30	32 1/2	-1 1/4	-3.7
A	LUNDY ELECTRONICS	4- 17	10 1/4	+1 1/4	+10.4
O	MSI DATA CORP	8- 27	18	0	0.0
N	MEMOREX	8- 34	13	+2	+10.1
O	NETWORK SYSTEMS CORP	14- 25	20 1/2	+ 1/2	+2.8
O	OMEX	2- 12	12	0	0.0
A	PARADYNE CORP	8- 28	43 1/4	- 7/8	-1.8
A	PENRIL CORP	8- 17	12 8/8	+ 3/8	+3.8
O	RAMTEK CORP	10- 23	10 1/4	0	0.0
O	RECOGNITION EQUIP	5- 21	11 1/8	+ 3/4	+7.2
O	SCAN DATA	1- 8	2	0	0.0
N	STORAGE TECHNOLOGY	12- 35	31 1/4	+1 7/8	+8.3
O	SYKES DATATRONICS	5- 29	22 1/4	-1	-4.3
O	T BAR INC	13- 24	14 7/8	+1	+7.2
A	TEC INC	3- 8	8 5/8	0	0.0
N	TEKTRONIX INC	42- 70	58 3/4	+2 1/8	+4.8
N	TELEX	3- 8	8 7/8	+ 1/8	+1.8
O	TESDATA SYSTEMS CP	8- 26	8 3/8	- 1/4	-2.8
A	TIMEPLEX INC	8- 22	11 1/4	- 1/4	-8.1
O	SILTEK INC	1- 3	1 7/8	0	0.0
	SUPPLIES & ACCESSORIES				
A	AMERICAN BUS PRODS	8- 17	10 1/2	0	0.0
O	BALTIMORE BUS FORMS	1- 2	1 1/8	0	0.0
N	BARRY WRIGHT	8- 33	18 7/8	+ 1/2	+2.7
O	CYBERMATICS INC	1- 2	1 1/8	0	0.0
A	DUPLEX PRODUCTS INC	11- 18	14 1/4	- 1/4	-1.7
N	ENNIS BUS. FORMS	13- 22	20 1/4	+ 8/8	+0.1
N	3M COMPANY	48- 88	53 1/4	- 1/4	-0.4
O	MOORE CORP LTD	27- 38	32	- 1/2	-1.8
N	NASHUA CORP	18- 35	18 3/8	+ 3/8	+1.8
O	STANDARD REGISTER	22- 38	37 3/4	+1 1/2	+4.1
A	TAB PRODUCTS CO	8- 38	21 1/4	- 1/2	-2.2
N	WALLACE BUS FORMS	18- 01	30	-1	-3.2

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